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ROYAL BOTANIC GARDENS, KEW

XX.—FASTIGIATE AND PYRAMIDAL TREES.

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Of the aberrant types of hardy trees, those with pendulous branches are probably the most popular in gardens, especially as isolated specimens on lawns. They are often indeed very attractive, particularly in association with the straight lines of buildings; some of them also make pleasant shady arbours for garden seats in summer time.

The value of fastigiate trees, with their slender, erect, often rigid shape, on the other hand, resides entirely in the effect they produce in the landscape. On a level, uniform tract of land, like that of Kew, they fill an attractive role in relieving flat, comparatively low masses of vegetation. One cannot walk round the Gardens without feeling how much the landscape owes to the Lombardy poplar—the commonest and perhaps the best of them all. How greatly, for instance, the charms of the Lake are heightened by groups of this tree at the south-west end.

Nearly every common tree has produced a fastigiate or at any rate a pyramidal "sport." The ash, the lime and the sycamore are exceptions and, except for a single tree at Aldenham, the common elm appears to be another. The genus *Ulmus* is, however, well represented in this respect by the Wheatley elm, one of the *U. nitens* group. There already exists in Kew a practically complete collection of these trees (apart from conifers), but they are growing in their respective collections and a general inspection of them would necessitate a rather lengthy pilgrimage. In view of the interest taken in them by tree-lovers at the present time, it has been thought desirable to assemble as many as possible in one readily accessible spot, so a commencement has been made on the western side of the Kew Palace Lawn, not far from the Sundial, where several trees of various kinds have recently been planted. To these it is proposed to add as occasion offers.

Fastigiate trees are not planted so freely as they might be in small gardens in the outer suburbs of London and other cities, where space for the typical forms is not available. A selection of a few of the best would add greatly to the interest of such places, besides providing an agreeable diversity in the vegetation. They are also especially adapted for planting on the sides of roads, where there is insufficient space for the ordinary type of tree.

Although fastigiate trees are usually and most conveniently propagated by grafting or by cuttings, some of them have the power of transmitting their distinctive peculiarity to their progeny raised from seed. The Cypress oak, for instance, raised from its own acorns, comes partially true, and the Lombardy poplar, although a male tree, has, by means of its pollen, transmitted its columnar shape in some measure to its hybrid offspring.

Whilst most fastigiate and columnar trees are aberrant forms, a certain number of genuine species assume the same shape ; amongst them may be mentioned *Acer Lobelii*, *Libocedrus decurrens*, *Prunus Simonii*, *Ulmus stricta* (the Cornish elm), *Magnolia salicifolia* and *Acer glabrum*.

Populus. The commonest of all fastigiate trees is the Lombardy poplar, *Populus nigra* var. *italica*. Its abundance is due to the facility with which it can be propagated by cuttings and its consequent cheapness, also to its easy cultivation and adaptability to different soils and climates. The facts of its origin are not precisely known and can now be only guessed at, but it seems to have appeared first on the banks of the river Po, probably (according to Henry) early in the eighteenth century. It is believed to have been introduced to England by the Earl of Rochford in 1758. It is now spread widely over the temperate regions of both hemispheres, attracting and pleasing the eye wherever it may be by its dominating height and slender shape.

It is similar to the ordinary black poplar, *P. nigra*, in leaf and twig, although occasionally pubescence may be found on the bark and leaf-stalks of vigorous young shoots. When young it has a tapering spire-like form, becoming columnar with age. The true Lombardy poplar is always male.

It was introduced to France in 1749 and eventually became popular as a road-side tree there. Lately it has given place in that country to some of the hybrid poplars. Writers of historical novels are occasionally guilty of an anachronism in describing it as lining the French roads in Plantagenet times. It is now being planted in considerable numbers along the new arterial roads of England in flat, low lying, moist localities, and in such places should provide very striking effects in a few years' time. A very frequent application to Kew is for advice in regard to the best tree to plant for hiding from view unsightly buildings or other objects that have suddenly sprung up within sight of the applicant's windows. For accomplishing this quickly, we are unable to recommend anything better than a double row of Lombardy poplars. They form a complete screen when in leaf, and although not so efficacious as an evergreen would be in winter, the branches are clustered so closely together that they make, even then, a useful screen. In good moist soil they are capable in their early years of increasing in height at the rate of six feet annually.

Although the true Lombardy poplar, as noted above, is a male, there are trees approximating it in shape which are female. There is one near Kew Palace which often sheds its cottony inflorescences during the summer ; it is not so slender in shape as the male and may have originated as a seedling from a female black poplar fertilised with the pollen of the Lombardy.

The Director informs me that he noticed a large Lombardy poplar in the Botanic Gardens, Christchurch, New Zealand, with a sporting branch high up on one side showing a loose, spreading branching like that of the ordinary black poplar. Photographs and specimens of the tree have been sent to Kew by Mr. James Young, Curator of the Christchurch Gardens. Mr. Young writes that he has struck cuttings from the sporting branch and that the plants, which are now three years old, do not show any signs of the fastigiate habit.

As this occurrence appears to be unique, the photograph of the tree is reproduced. (Plate V.)

In Algeria the Lombardy poplar develops a remarkable white bark on the trunk and the same thing has been noticed in Asia Minor and Serbia. Mr. L. A. Dode, of Paris, has named these white-stemmed poplars *P. thevestina*, but they do not differ in botanical characters from the Lombardy poplar. The white bark is probably due to some climatic condition ; trees raised from cuttings brought from Algeria by the Director in 1910, and now growing in the collection of poplars, show very little development of this character as yet.

P. nigra var. *plantierensis* originated as a chance seedling in the nursery of Messrs. Simon-Louis at Metz. Similar in growth to the Lombardy poplar, it is distinguished by its pubescent leaf-stalks and young shoots, for which reason it is assumed to have originated as a hybrid between the Lombardy poplar and var. *betulifolia*, a variety of the black poplar marked by the same pubescence. A tree of var. *plantierensis* in the poplar collection is 38 feet high.

P. alba var. *pyramidalis*, " Bolle's White Poplar." Compared with the Lombardy poplar in mode of growth this tree, although quite fastigiate, is considerably wider in proportion to its height. It is, of course, a form, differing only in habit, of the " Abele " or common white poplar. It appears to be of natural origin and to have first been noticed in 1841, " forming a little grove on the bank of a brook on the north side of the Karataw Mountains between Bokhara and Samarcand " (*Garden*, December 10, 1887, p. 543). A tree at Kew near the site of the Sun Temple was measured by Elwes and Henry in 1910 and was then 67 feet high ; they regarded it at that time as the finest in England. It is now well over 70 feet high with a trunk girthing 6 feet 9 inches. The pure white under-surface of the leaves gives a lively effect when they are moved by the wind and the tree may be regarded as one of the most ornamental of these fastigiate trees.

Acer saccharum var. *monumentale* is a very distinct variety of the sugar maple, introduced from the United States to Kew in 1888. It is now 31 feet high and 2¼ feet in girth of trunk. It is notable for its columnar shape due to the shortness of its side branches, which take an upward direction, but are not strictly fastigiate.

A maple of somewhat similar growth is *Acer Lobelii*, but this is a good species, native of South Italy. It is related to the Norway Maple (*A. platanoides*), of which it has, by some authorities, been made a variety.

Aesculus Hippocastanum var. *pyramidalis* is a well-marked form of common horse-chestnut, with stiffly erect branches. It is, however, of a broadly pyramidal shape and not at all columnar. There is a good example in the collection near the Refreshment Pavilion, 25 feet high.

Alnus incana var. *Balfourii*. We have recently received from Mr. F. R. S. Balfour a parcel of grafts with an accompanying letter dated April 5th, in which he says: "When in Norway two years ago, fishing in the Gloppen River, I found a tree of *Alnus incana* quite fastigiate and growing wild in a thicket. I marked it down and hearing that you are forming at Kew a separate collection of fastigiate trees, I wrote to Norway with the result that this package of twigs has been sent to me by Mr. Siversten of Sandané, Nordfjord." The twigs have been used both as grafts and as cuttings and we trust this interesting alder may be added to our collection in due course. It appears to be a quite new addition to fastigiate trees.

Betula verrucosa var. *pyramidalis*. This, the fastigiate white birch, is one of the most conspicuous trees in the collection at Kew. The best example, obtained from the nursery of Messrs. Dickson, of Edinburgh, in 1878, is 60 feet high, of slender columnar shape, with a trunk girthing 3 feet 2 inches. The variety is rarely seen in gardens, but is certainly worth planting as one of the most effective of fastigiate trees.

Carpinus Betulus. There are two fastigiate forms of the common hornbeam—*columnaris* and *pyramidalis*. Both are characterised by a thick clustering of erect branches and twigs, but the former is the more slender of the two and would make a useful street or wayside tree.

Crataegus monogyna var. *stricta*. This curious variety of the common hawthorn produces a dense head of erect branches which is very distinct from the typical tree. It can scarcely be called elegant, as its shape is in no way slender, but rather broad and massive. There are two trees, the larger 32 feet high, which have long been in the collection of thorns at Kew, and which flower with all the freedom of the common hawthorn.

Castanea sativa var. *pyramidalis*. The only form of sweet chestnut known to us that approaches the pyramidal shape is one which was found by the late Mr. W. Goldring in the grounds of Mount Mascal, Bexley, Kent. He obtained grafts for Kew and it is now represented in our collection by a young tree 22 feet high. It is not strikingly pyramidal, but its branching is erect enough to distinguish it amongst its allies.

Fagus sylvatica var. *fastigiata*, the Dawyck beech. The representatives of this beech at Kew have all been raised from grafts presented by Mr. F. R. S. Balfour, in whose garden at Dawyck, near Peebles, a tree has long been growing. It is the only old specimen known to us in the British Isles, and is figured by Elwes and Henry in "The Trees of Great Britain and Ireland," vol. vii. plate 406, under the varietal name *Dawyckii*. This name, however, must give place to the older one given above.

The Dawyck beech is a slender, strictly fastigiate tree, and Mr. Balfour's specimen is over 50 feet high; except for a thick cluster of branches which give it a broad bushy base, it is very like a Lombardy poplar in form. The young trees at Kew, the largest of which is 30 feet high, are of even more slender shape. The leaves are smaller than those of common beech. Mr. Balfour informs us that his tree originated in the neighbourhood of Dawyck, and it possibly differs from the beech originally named *fastigiata* by Koch, which I have not seen.

Koelreuteria paniculata var. *fastigiata*. In April, 1888, Miss Corner, of The Grove, Hammersmith, sent some seeds labelled "*Koelreuteria paniculata*" to Kew with the information that they came from Shanghai. From them was raised a tree now growing in the collection of *Sapindaceae* near the Ruined Arch. It is 28 feet high and one of the most strictly fastigiate trees in Kew, the spread of the branches being only 30 inches at the widest part. I can find no record of a fastigiate *Koelreuteria* in the standard works of Elwes and Henry, Schneider or Rehder. It would seem probable, therefore, that this rather remarkable tree has originated at Kew.

Liriodendron Tulipifera var. *pyramidale*. All the forms of the tulip tree are interesting on account of the unique shape of the leaves amongst hardy trees, and this one, with its erect branches, is doubly so. It is a slow-growing tree compared with the type, and the largest one at Kew is only 22 feet high, although it has been grown in the collection of *Magnoliaceae* in the Berberis Dell for nearly thirty years. The finest tree known to me is in the old-established nursery of Messrs. Simon-Louis at Metz; when I saw it there over twenty years ago it was a shapely spire 30 feet high.

Morus alba var. *fastigiata*. This variety of white mulberry has a narrowly pyramidal shape and is further distinguished from the type by the leaves being often more than usually lobed. At Kew, like

other forms of white mulberry, its young shoots are almost invariably cut back by winter frost, and this depreciates its value as an ornamental tree.

Prunus Lannesiana var. *erecta*. This is a very curious form of the Japanese Cherry forming a cluster of perfectly erect stems. It is known to Japanese gardeners as "Amanogawa." The flowers are pale pink, single or semi-double, fragrant, and it has the distinction, rare among the Japanese Cherries at Kew, of producing occasionally quite good crops of small black fruits. Wilson describes it as "very beautiful," but I have not seen any trees in this country that deserve that epithet, although Mr. Lowinsky used to grow a goodly number of them in his garden at Tittenhurst, Sunninghill.

Pyrus. Fastigiate trees belonging to this genus occur in the rowan (*P. Aucuparia*), and in *P. pinnatifida*, both of which are attractive trees in their ordinary shape. These varieties only differ in their narrow shape, but this may enable gardeners whose space is restricted to find room for them.

Quercus pedunculata var. *fastigiata*. This, the "Cypress Oak," occurs in a wild state in several localities in France and Spain, and a tree at Herrenhausen in Hesse Darmstadt, originally found in a forest there, was doubtless also of natural origin. This tree was described and figured in the *Gardeners' Chronicle* for 1842, p. 36, and measured at that time nearly 90 feet in height and nearly 12 feet in girth of trunk. It appears to have been the parent of many continental and English trees, but is probably no longer in existence. A fine specimen in the park at Wilhelmshöhe, near Cassel, which originated as a graft from this tree, is now over 100 feet high. There are several trees at Kew, the best of which is 55 feet high; it was planted in the collection of oaks in 1871, and in 1897 was about 45 feet high. It is not, therefore, a quick grower. The habit of the tree is slenderly columnar. As has been mentioned previously, it comes true to a small extent from seed, and some sub-varieties have been raised in this way; sub-var. *contorta* has its young branches crooked and twisted, and sub-var. *Grangei* is a seedling that has partially reverted to the type and thereby become pyramidal rather than columnar. Except that it is slow-growing, the Cypress oak would be useful as a roadside tree, especially where lateral space is restricted. In such a place it would not only make, eventually, as striking a feature as the Lombardy poplar, but would be likely to have a much longer life.

Robinia pseudacacia var. *fastigiata*. This remarkably distinct form of the common "Acacia" or "Locust tree" is one of the most slender in habit of all this class of tree. A good example in the collection of *Leguminosae* at Kew near the Pagoda is 55 feet high and only 8 feet in width. I do not know whether its origin is anywhere recorded, but it has been in existence for at least eighty years. It is nevertheless one of the rarest of these fastigiate trees.

There is a variety of the common "Acacia," known as *monophylla*, in which the number of leaflets to each leaf is reduced often to one (but also to two or three). This also has sported into a fastigiate form (*monophylla fastigiata*). It is not so slender as the other.

Elms. The "Wheatley Elm," *Ulmus stricta* var. *Wheatleyi*, is the best known and most valuable of pyramidal elms and is now being extensively planted as a roadside tree. There are two forms in cultivation that differ in habit, one having a much closer, more erect branching than the other. The best tree at Kew, obtained from Messrs. Lee's nursery just fifty years ago, is now 60 feet high and 4 feet 4 inches in girth of trunk. An even finer one grows in the Terrace Gardens at Richmond. There is also a yellow-leaved form of the Wheatley Elm.

Ulmus montana has a variety called *fastigiata* that is commonly known as the "Exeter" elm, through having been found in or near that city by a Mr. Ford about 1826. There is a fine tree of it in the Vicarage garden at Bitton, near Bristol, 70 feet high. Its branches grow erect and the leaves, smaller than in the type, are often clustered at the end of the shoot. On the whole it is not particularly attractive.

The commonest and best known of all evergreen fastigiate trees is the Irish yew, which, as is now well known, was first found in the mountains of Fermanagh about 1780. Presumably it was of natural origin and grew from seed on the spot where it was discovered, but it is curious that two plants of the same mode of growth were found. Aberrant forms of seedling origin usually come as individuals. Both the wild plants were transplanted, one to the garden of the man who found them, the other to Florence Court. The former died, but the latter still lives and is the ultimate source, no doubt, whence most or all of the Irish yews that now exist were derived. In the young state the plant is of columnar form, but with age becomes broad at the top, sometimes of an inversely pyramidal shape. In old gardens it has often been planted in avenues or formal arrangements, but although entirely distinct from any other tree, the effect of a number of specimens in association is rather dismal. It has sported into a sub-variety with golden young leaves called *fastigiata aurea*.

The Florence Court yew is a female and its flowers, when fertilised with pollen from common yew, have produced seed from which plants have been raised, that show its influence in an intermediate type of growth. The variety called *cheshuntensis* is one of them.

In the *Kew Bulletin*, 1927, p. 254, there is an account of the discovery by Mr. W. H. B. Fletcher, of Aldwick Manor, Bognor, of a considerable number of male plants of Irish yew growing in his neighbourhood. All of them appear most probably to have been obtained from the Barnham Nurseries Ltd., near Bognor, where Mr. Fletcher found, in 1927, some male specimens of the golden form still in nursery quarters. But how or whence the firm originally acquired them is no longer ascertainable.

Another and fairly well-known member of the Yew family, fastigiate in growth, is *Cephalotaxus pedunculata* var. *fastigiata*. It is of Japanese origin and was introduced from that country in 1861. Like the Irish yew it is columnar in youth, but becomes broad-topped with age. It is, of course, very distinct in its larger, longer leaves.

Two very well-known fastigiate trees amongst conifers are *Cupressus macrocarpa* var. *fastigiata*, a form of the "Monterey Cypress," and *C. sempervirens* var. *stricta*, the "Italian Cypress." Both these are much better known in gardens than the types from which they have sprung, and both of them survive our winters at Kew, although they are not really vigorous here. This may be due, however, more to atmospheric influences than to climatic ones. A few trees of a form of the Italian Cypress recommended to us some years ago as being more hardy than the ordinary form have been planted on the south side of King William's temple. They are of very slender shape, have grown well and up to the present have justified their recommendation. To travellers in Italy and other parts of South Europe the dark slender spires of this tree constitute one of the most abiding memories.

The fastigiate form of *C. macrocarpa* is much grown in the milder parts of Britain. It grows very rapidly, makes a useful wind-break, and it is sometimes used to form tall hedges.

Of Lawson Cypress (*Cupressus Lawsoniana*) there are several erect-growing, slender varieties, the most popular of which are *Allumii*, spire-like in shape and wholly glaucous; *erecta viridis*, green and much more vigorous, and, in places where the Italian Cypress is too tender, a good substitute for it. Even better, perhaps, is the var. *Drummondii*, admirably represented in Mr. Neville Cooper's pinetum near Canterbury, but apparently very uncommon.

A slender columnar variety of *Thuya plicata*, called *fastigiata* or *pyramidalis*, is a distinct and quite attractive form. It is represented at Kew by a tree 35 feet high.

Abies pectinata var. *pyramidalis* is a spire-like tree of arresting shape and appearance, but, like its type, it refuses to exist in the lower Thames Valley. There used to be (perhaps is now) a fine example of it in Lavallée's Arboretum at Segrez in France; it was 35 feet high when I saw it there over twenty years ago. There is a similar variety of common spruce—*Picea excelsa* var. *pyramidata*—which makes a slender pyramid.

Three forms of common juniper are to be included in this group of trees, viz., *Juniperus communis* var. *hibernica*, *J. c.* var. *suecica* and *J. c.* var. *compressa*. The two former are similar in their tall, slender, columnar shape, and by some authorities are considered identical, but *suecica* is kept separate by nurserymen on account of the pendulous terminal twigs. The variety *compressa*, of very slow

growth, is distinct from any other tree or shrub, forming as it does a dense mass of branches and silvery grey leaves of rigidly slender, erect shape; a plant may take twenty years to grow a little over one foot high. It makes an extremely effective little shrub for the Rock Garden.

XXI.—CONTRIBUTIONS TO THE FLORA OF SIAM.* ADDITAMENTUM XXVI.

Talauma siamensis *Dandy* [Magnoliaceae-Magnolieae]; a *Talaumae* speciebus aliis duabus in Siam peninsulari adhuc inventis differt, a *T. betongensi* Craib carpellis multo paucioribus, a *T. Candollei* Blume omnibus partibus (gemmis axillaribus exceptis) glabris.

Arbor parva, circa 8 m. alta (ex *Kerr*); ramuli glabri; gemmae axillares adpresse fulvo-pubescentes. *Foliorum* lamina plus minusve elliptico- vel lanceolato- vel oblanceolato-oblonga, basi cuneata vel rarius obtusa, apice rotundata vel obtusa vel acuta vel breviter acuminata, interdum leviter emarginata, usque ad circa 27 cm. longa et 10 cm. lata, tenuiter coriacea vel coriacea, glabra, in sicco utrinque manifeste reticulata, nervis lateralibus utrinsecus circa 12–16 subtus conspicue prominentibus; petiolus usque ad circa 2·5 cm. longus, glaber. *Alabastrum* ovoideo-ellipsoideum; bracteae spathoideae, glabrae; pedunculus crassus, circa 1–2 cm. longus, glaber. *Perianthium* 3-merum; tepala 9, glabra, 3 exteriora obovato-oblonga, circa 3·5–4 cm. longa. *Antherae* connectivum ultra loculos in appendicem longulam peracutam productum. *Gynaecium* subellipsoideum; carpella circa 7–10, glabra. *Fructus* immaturus (et verisimiliter maturus) subellipsoideus; carpella matura crasse lignosa, rostrata, usque ad circa 4·5 cm. longa, rostro apicali longulo acuto.

Chumpawn, Siepyuan, *Put* 936 (*type*); 50 m., evergreen forest, *Kerr* 11644.

Magnolia Craibiana *Dandy* [Magnoliaceae-Magnolieae]; inter *M. coco* DC. speciesque affines ponenda, quarum ad *M. coco* et *M. pulgarensem* Dandy ob glabritatem proxime accedit sed ab utraque foliis apice obtusis rotundatisve nec acuminatis facile distinguenda.

Arbor parva, circa 8 m. alta (ex *Kerr*), omnino glabra, ramulis iunioribus apicem versus glaucescentibus. *Folia* persistentia; lamina elliptico- vel ovato- vel lanceolato-oblonga, basi cuneata, apice obtusa vel rotundata, interdum leviter emarginata, usque ad circa 14 cm. longa et 6 cm. lata, tenuiter coriacea, in sicco utrinque conspicue reticulata, nervis lateralibus utrinsecus circa 10-15 subtus satis prominentibus; petiolus interdum longitudinis circa 2 cm. attingens sed plerumque infra 1·5 cm. longus, superne usque ad apicem cicatrice stipulari notatus; stipulae petiolo adnatae. *Alabastrum*

*Continued from *K.B.* 1928, p. 247.

lanceoloideo- vel anguste ellipsoideo-oblongum, iuvenile in bracteis spathoideis pluribus extus glaucescentibus inferioribus mox deciduis inclusum; pedunculus erectus vel suberectus, subgracilis, circa 1–1·5 cm. longus, glaucescens, bractearum cicatricibus notatus. *Perianthium* 3-merum; tepala 9, subsimilia et subaequalia, 3 exteriora plus minusve elliptico-oblonga (ex alabastro), 6 interiora basi angustatiora. *Staminis* filamentum brevissimum, crassum; anthera linearis, introrse dehiscens, connectivo ultra loculos in appendicem brevem acutam producto. *Gynaecium* sessile, subellipsoideum; carpella circa 11, glabra.

Nakawn Sritamarat, Kao Luang, 1400 m., evergreen forest, *Kerr* 15537.

In the absence of mature fruit it is impossible to be certain whether this plant is a *Magnolia* or a *Talauma*, but from the appearance of the material its affinities seem to be closest with the section of *Magnolia* which includes such species as *M. coco* DC., *M. Championii* Benth., *M. pulgarensis* Dandy, and *M. pachyphylla* Dandy.

Pygeum ferreum *Craib* [Rosaceae-Pruneae]; a *P. floribundo* Koehne lenticellis haud conspicuis, foliis minoribus eorumque nervis lateralibus pagina superiore haud impressis recedit.

Arbor circa 8 m. alta (ex *Kerr*); ramuli iuventute angulati, ferrugineo-tomentosi, mox teretes, glabri, cortice cinereo-brunneo vel subcinereo obtecti, lenticellis haud numerosis parum elevatis. *Folia* lanceolato-ovata vel subovata, apice subacuta, costa excurrente apiculata, basi rotundata vel late cuneata, usque ad 10·5 cm. longa et 4·5 cm. lata, rigide chartacea, sicco supra fuscescentia, subtus subferruginea, matura supra ad costam tomentella, aliter glabra, subtus ad costam tomentella, aliter glabra vel ad nervos nervulosque parce pilosa, paulo supra basem glandula solitaria transverse elliptica sessili utrinque instructa, nervis lateralibus utrinque 8–10 intra marginem anastomosantibus, supra sat conspicuis subtus prominentibus, margine integra, saepissime parum revoluta, petiolo ad 15 mm. longo primo ferrugineo- cito cinereo-tomentello suffulta; stipulae fugaces. *Racemi* e nodis infra folia orti, 3–6-fasciculati, rhachi pedicellis et receptaculo densius ferrugineo-tomentellis; pedicelli inferiores ad 12 mm. longi; bracteae cito deciduae, 2·5 mm. longae, oblongae, dorso margineque ferrugineo-pubescentes; flores albi, odorati (ex *Kerr*). *Receptaculum* circa 3 mm. longum, intra basi et apice pilosum. *Sepala* deltoidea, acuta, ad 1·3 mm. longa, dorso ferrugineo-pilosa. *Filamenta* ad 3·5 mm. longa, inferne pilis paucis sat longis instructa, antheris anguste oblongis ad 1 mm. longis. *Ovarium* dense hirsutum, 2 mm. altum, ovulis duobus pendulis; stylus 5 mm. longus, inferne pilis perpaucis instructus, superne parum unilateraliter sulcatus; stigma obliquum, unilateraliter canaliculatum.

Nakawn Sritamarat, Kao Luang, 1300 m., evergreen forest, *Kerr* 15501.

Rubus angkae *Geddes* [Rosaceae-Rubeae] ; a *R. moluccano* Linn. foliis altius lobatis, lobis angustioribus, stipulis fimbriis multo brevioribus recedit.

Frutex scandens ; ramuli steriles iuventute dense ferrugineo-pilosi et aculeis rectis subsparse instructi, floriferi sparius pilosi et aculeis brevioribus instructi, mox glabri vel fere glabri, parum striati, cortice brunneo vel pallide brunneo obtecti, lenticellis obscuris. *Folia* ultra medium palmatim 5-lobata, ambitu subrotundata, basi cordata, 10–17 cm. diametro, lobis lanceolatis vel anguste oblongo-lanceolatis apice acutis vel acute subacuminatis, mediano 7–14 cm. longo 2·5–3·5 cm. lato, basalibus interdum iterum lobulatis, chartacea, supra primo bullata, setulosa et ad costas dense pubescentia, matura laevia, ad costas dense pubescentia, aliter glabra, subtus primo dense adpresse pilosa, matura pallide cinnamomea, ad costas nervosque sparse pilosa vel pubescentia, aliter dense arachnoidea, e basi 5-costata, costis supra conspicuis vel parum impressis subtus prominentibus, nervis loborum lateralibus utrinque ad 10 intra marginem anastomosantibus supra impressis subtus prominentibus, nervulis reticulatis supra impressis subtus prominulis, margine denticulata, petiolo 4–7 cm. longo sparse aculeato maturo piloso vel sparse piloso suffulta ; stipulae circa 1 cm. longae et 6 mm. latae, pinnatim fimbriatae, deciduae, dorso pilosae. *Glomeruli* et axillares, petiolo multo breviores, et in ramulis terminalibus et axillaribus aphyllis dispositi ; pedicelli breves vel usque ad 1 cm. longi, pubescentes et dense arachnoidei ; flores albi (ex *Kerr*). *Receptaculi* tubus circa 2 mm. longus, dorso primo densius ferrugineo-pilosus, intra basi hirsutus. *Sepala* lanceolata, acuta vel apice 3-dentata, ad 8 mm. longa et 3·5 mm. lata, dorso indumento ei receptaculi simili tecta, intra tomentella. *Petala* subobovata, apiculata, circa 7 mm. longa et 4 mm. lata, pagina utraque sparse subsericea. *Stamina* petalis breviora, glabra. *Carpella* glabra, reticulata, stylis circa 4 mm. longis.

Doi Angka, 1000 m., clearing by stream, *Kerr* 5283.

Rubus ferreus *Geddes* [Rosaceae-Rubeae] ; a *R. birmanico* Hook. f. foliis longius pilosis, margine minutius denticulatis, floribus densissime tomentosis differt.

Frutex scandens ; ramuli primo molliter et patenter pilosi et hirsuti. *Folia* ambitu rotundata, palmatim 5-lobata, lobis apice acutis, basi cordata, 6–8 cm. longa, 7–9·5 cm. lata, supra sicco ferruginea, rugulosa, pilosa, subtus molliter pilosa, nervis 5 e basi radiantibus pagina superiore conspicuis inferiore prominentibus, margine bidenticulato-serrata, ciliata, petiolo circa 6 cm. longo piloso et hirsuto suffulta ; stipulae laciniatae, pilosae, laciniis pectinatis. *Cymae* axillares et terminales, congestae, sericeo-pilosae ; pedicelli circa 4 mm. longi, tomentosi ; bracteae laciniatae, molliter pilosae. *Receptaculum* sericeo-pilosum ; discus prope carpella hirsutus. *Sepala* 5, lanceolata, nonnulla integra, nonnulla apice pinnatifida, circa 9 mm. longa. *Petala* 5, alba (ex *Kerr*), rotundata vel obovata,

venata, 7-8 mm. longa. *Filamenta* subulata, 2·5–4 mm. longa, glabra, antheris 0·6 mm. longis. *Carpella* glabra; styli tenues, 5–6 mm. longi, glabri. *Fructus* ruber (ex *Kerr*).

Doi Angka, 2400 m., more open spots of evergreen forest, *Kerr* 5310.

Pyrus crenulata *Geddes* [Rosaceae-Pomeae]; a *P. cuspidata* Bert. foliis breviter acuminatis glabris, cymis laxioribus haud tomentosis, a *P. polycarpa* Hook. f. foliis latioribus minoribus, nervis numerosis, margine crenulata haud serrata differt.

Arbor circa 10 m. alta (ex *Kerr*), ramulis glabris iuventute brunneis mox nigris vel cinereo-nigris conspicue vel haud conspicue lenticellatis. *Folia* saepissime rotundato-ovata, apice acuminata, subacuta, basi truncata vel rotundato-truncata, 6–8·2 cm. longa, 3·7–5·4 cm. lata, chartacea, supra brunnea, nitentia, glabra, subtus pallidiora, glabra, nervis lateralibus utrinque 9 paginis ambabus conspicuis, crenulata, petiolo 2·3–3·2 cm. longo suffulta; stipulae cito deciduae. *Cymae* terminales, ad 6 cm. longae, laxae, glabrae; pedicelli ad 1 cm. longi, filiformi-bracteolati; bracteae deciduae. *Calycis* lobi 5, ovati, 2 mm. longi, 1·5 mm. lati, glabri. *Petala* 5, oblonga, apice obtusa, basi cuneata, 5 mm. longa, 3·75 mm. lata, glabra. *Stamina* biseriata, filamentis filiformibus, longioribus 6 mm. brevioribus 3 mm. longis, antheris oblongis 0·6 mm. longis. *Ovarium* 3-loculare, loculo quoque biovulato, glabrum; styli tres, 5 mm. longi, basi connati; stigmata capitata. *Fructus* globosus, 14 mm. diametro.

Korat, Kao Lêm, 1100 m., evergreen forest, *Kerr* 9937 (*type*), and 1300 m., scrub, *Kerr* 9937A.

Raphiolepis fragrans *Geddes* [Rosaceae-Pomeae]; a *R. indica* Lindl. foliis oblanceolatis longioribus, receptaculo haud piloso recedit.

Arbor 8–10 m. alta (ex *Kerr*), ramulis glabris vel iuventute subpuberulis cortice primo rubro-brunneo mox griseo obtectis, lenticellis inconspicuis. *Folia* alterna, oblanceolata vel oblongo-oblanceolata, apice obtuse et breviter acuminata, basi cuneata, 7·5–9·8 cm. longa, 2–3·5 cm. lata, supra viridia, nitentia, primo medio parce pilosa, cito glabra, subtus pallidiora, glabra, nervis lateralibus utrinque circa 10 supra prominulis subtus conspicuis, costa subtus prominente, margine distanter anguste serrata, revoluta, petiolo 1–1·8 cm. longo primo piloso cito glabro suffulta. *Inflorescentia* terminalis, cymosa; pedicelli 8–12 mm. longi, puberuli. *Receptaculum* parce pubescens. *Sepala* longe deltoidea, subacuta, 4 mm. longa, dorso praesertim ad marginem pubescentia. *Petala* 5, alba (ex *Kerr*), obovata vel late oblonga, apice emarginata, basi cuneata, 8 mm. longa, 5·5 mm. lata, brunneo-pilosa. *Stamina* numerosa, biseriata, filamentis filiformibus 3·5 mm. et 7 mm. longis, antheris oblongis 0·8 mm. longis. *Ovarium* glabrum, 2-loculare,

loculis 2–ovulatis ; styli 2, parte inferiore connati, 8 mm. longi, partis liberae ad basem pubescentes ; stigmata parva.

Kemarat, 100 m., evergreen forest, *Kerr* 8257A (*type*). Surin, Sanka, 100 m., light evergreen forest, *Kerr* 8257.

Raphiolepis Kerrii *Geddes* [Rosaceae-Pomeae] ; a *R. japonica* Sieb. et Zucc. foliis longioribus, inflorescentia haud tomentosa differt.

Arbor circa 7 m. alta (ex *Kerr*) ; ramuli iuventute parce pubescentes, brunnei, nitentes, mox glabri, grisei, lenticellis inconspicuis. *Folia* alterna, oblanceolata vel late oblanceolata, apice subito et breviter acuminata, basi cuneata vel acuminata, 6·5–11·5 cm. longa, 1·8–4 cm. lata, supra viridia vel sicco brunnescentia, nitida, primo medio densius pilosa, cito glabra, subtus glabra, nervis lateralibus utrinque circa 10 haud conspicuis, costa subtus prominente, margine integra vel rare et inconspicue serrata, revoluta, petiolo 1·5–1·8 cm. longo primo piloso cito glabro suffulta. *Cymae* terminales, 5–6 cm. longae, pedunculis pubescentibus ; pedicelli circa 2 mm. longi, apice bibracteolati, basi articulati. *Receptaculum* extra puberulum. *Sepala* 5, deltoidea, subacuta, 2·5 mm. longa, extra puberula, intra et ad marginem ferrugineo-pubescentia. *Petala* 5, alba (ex *Kerr*), apice emarginata, basi cuneata, 7·5 mm. longa, 4·5 mm. lata, glabra. *Stamina* numerosa, biseriata, filamentis subulatis, longioribus 5·5 mm. longis, brevioribus 3 mm. longis, antheris oblongis 0·8 mm. longis. *Ovarium* glabrum, 2-loculare, loculis biovulatis ; styli 2, basi inter se connati, 6 mm. longi, glabri ; stigmata parva.

Lôi, Kao Krading, 1200 m., open evergreen forest, *Kerr* 8689.

Eriobotrya stipularis *Craib* [Rosaceae-Pomeae] ; ab *E. bengalense* Hook. f. stipulis foliaceis saepe persistentibus, bracteis persistentibus, stylis fere ad medium inter se connatis recedit.

Arbuscula circa 6 m. alta (ex *Kerr*) ; ramuli cito glabri, cortice brunneo vel cinereo-brunneo mox cinereo obtecti, lenticellis haud numerosis. *Folia* saepissime oblongo-oblanceolata, rarius late lanceolata vel late oblanceolata, apice acuminata, acuta vel obtusa, basi cuneata, interdum parum inaequilateralia, latere altero acuminata, altero cuneata, 9–18 cm. longa, 3·5–7 cm. lata, subcoriacea, sicco viridia, subtus parum pallidiora, pagina utraque glabra, nervis lateralibus utrinque circa 10 supra conspicuis vel parum prominulis subtus prominulis ad marginem currentibus vel saepissime intra marginem furcatis ramulis ad marginem currentibus, nervis transversis numerosis inter se plus minusve parallelis pagina utraque conspicuis vel subconspicuis, margine nisi inferne crassius crenato-serrata, petiolo 1·5–2·7 cm. longo glabro suffulta ; stipulae foliaceae, oblongae vel ellipticae, 6–13 mm. longae, 4–10 mm. latae, distincte stipitatae, pluricostatae, margine subintegrae vel saepissime serratae, subcoriaceae, diu persistentes. *Panicula* terminalis, subsessilis vel breviter pedunculata, ad 8 cm. longa, ramulis lateralibus utrinque paucis simplicibus ad 6 cm. longis, tomento ferrugineo mox cinereo

tecta ; flores subsessiles vel pedicello ad 4 mm. longo suffulti ; bracteae saepissime persistentes, anguste oblongo-spatulatae, obtusae, sat crassae, 3 mm. longae, 1·5 mm. latae, dorso tomentellae, intra glabrae ; bracteola solitaria, bractea paulo minor, paululo supra pedicelli medium inserta. *Receptaculum* subpatelliforme, vix 5 mm. diametro. *Calycis* segmenta deltoidea, subacuta, circa 2 mm. longa et basi 2·5 mm. lata. *Petala* late ovata vel subquadrato-ovata, obtusa, ungui brevi lato incluso 4 mm. longa, 3 mm. lata, intra basem versus sparse pilosa. *Stamina* glabra, ad 4 mm. longa. *Discus* glaber, radiatus. *Styli* 4·5 mm. longi, paulo ultra medium bilobati, nisi superne pilosi, stigmatibus parvis obliquis ; ovarium biloculare, ovulis per loculo 2 erectis.

Satul, Adang, 500 m., on rocky ridge, *Kerr* 14125.

Polyosma adangensis *Craib* [Saxifragaceae-Escallonieae] ; ab affini *P. ilicifolia* Blume pedicellis multo brevioribus inter alia recedit.

Arbor circa 7 m. alta (ex *Kerr*) ; ramuli primo fusci, breviter adpresse pubescentes, mox glabri, cortice cinereo vel brunneo-cinereo obtecti, lenticellis haud conspicuis. *Folia* oblanceolata vel oblongo-oblanceolata, apice acuminata, costa excurrente apiculata, basi cuneata, 5–10 cm. longa, 2·4–3·5 cm. lata, rigide chartacea, sicco fuscescentia, subtus parum pallidiora, supra glabra vel ad costam hic et illic parce puberula, subtus ad costam nervosque laterales, rarius aliter, sparse adpresse pubescentia, costa supra impressa subtus prominente, nervis lateralibus utrinque 10–12 intra marginem anastomosantibus supra conspicuis vel subconspicuis subtus prominulis, margine rarissime integra, saepissime apicem versus plus minusve crassius pauci-denticulata, petiolo 8–15 mm. longo subterete plus minusve adpresse pubescente suffulta. *Inflorescentia* terminalis, pedunculo communi circa 2 cm. longo incluso circa 10 cm. longa, rhachi simplice ut ramulis pubescente ; pedicelli sub anthesin vix 2 mm. longi, subsericei, apice bracteolis 3 brevibus instructi ; flores albi (ex *Kerr*). *Receptaculum* 1·5 mm. longum, subsericeum. *Calyx* circa 1 mm. longus ; tubus brevis ; lobi late deltoidei, acuti. *Petala* linearia, obtusa, 7·5 mm. longa, basem versus 1·75 mm. lata, pluricostata, dorso pilis brevibus sericeis adpressis subsparse instructa, intra nisi inferne pilosa. *Filamenta* sat crassa, 4 mm. longa, pilosa, antheris linearibus 3 mm. longis. *Stylus* 6·5 mm. longus, papillosus.

Satul, Adang, 600 m., evergreen forest, *Kerr* 14142.

Polyosma arguta *Craib* [Saxifragaceae-Escallonieae] ; a *P. concocarpa* Ridl. et *P. mutabile* Blume endocarpii iugis acutis, foliis obsolete denticulatis recedit.

Arbor circa 7 m. alta (ex *Rabil*) ; ramuli novelli densius adpresse fulvo-pubescentes, mox fusci, sparsius adpresse pubescentes, demum pallide corticati. *Folia* oblongo-oblanceolata, oblongo-lanceolata, vel suboblonga, apice obtuse acuminata, basi cuneata, interdum

inaequilateralia, 12–19 cm. longa, 3·8–6 cm. lata, chartacea, sicco supra fuscescentia, subtus subviridia, supra ad costam puberula, aliter glabra, subtus ad costam nervosque laterales breviter adpresse pubescentia, aliter pilis adpressis sparse instructa, vel fere glabra, costa supra impressa subtus prominente, nervis lateralibus utrinque 10–12 intra marginem anastomosantibus supra plus minusve conspicuis subtus subprominentibus, nervulis supra subobscuris subtus subprominulis, margine obsolete vel hic et illic conspicue denticulata, rarissime integerrima, petiolo ad 1·5 cm. longo indumento ei ramulorum simili tecto suffulta. *Infructescentia* terminalis, pedunculo communi ad 2 cm. longo incluso circa 12 cm. longa, rhachi tenuiter sericea ; pedicelli circa 5 mm. longi, sericei vel sparse sericei, apice bracteolis tribus brevibus instructi ; drupae sicco nigrae, ambitu oblongae vel suboblongae, stylo basi persistente apiculatae, calyce persistente coronatae, circa 1 cm. longae, basi 6 mm. diametro, endocarpio conspicue acute acuminato longitudinaliter 8-sulcato sulcis 2 lateralibus aliis altioribus iugis acutis vel subobtusis haud rotundatis.

Kaw Chang, Kao Faimai, *Rabil 7*.

Polyosma bracteolata *Craib* [Saxifragaceae-Escallonieae] ; species nova ab aliis bracteolis elongatis, mediana receptaculo subaequilonga vel eo longiore, receptaculo sub anthesin saepe distincte canaliculato, filamentis antheris conspicue longioribus distinguenda.

Arbuscula circa 8 m. alta (ex *Kerr*) ; ramuli primo sericei, cito fusci, longitudinaliter striati, pilis brevibus adpressis sericeis sparse instructi, mox brunneo-stramineo-corticati, lenticellis vix conspicuis. *Folia* oblongo-oblanceolata vel oblongo-elliptica, apice acuminata, costa excurrente apiculata, basi cuneata, haud rarius parum inaequilateralia, 9·5–21 cm. longa, 3–6 cm. lata, sicco supra fuscescentia, subtus fusco-viridia, chartacea vel rigide chartacea, supra glabra vel ad costam puberula, subtus ad costam nervosque laterales adpresse pubescentia, matura subglabra, nervis lateralibus utrinque circa 10–12 supra plus minusve conspicuis subtus subprominentibus intra marginem anastomosantibus, costa supra impressa subtus prominente, margine integra vel remote obsolete denticulata, petiolo 8–17 mm. longo sparse adpresse pubescente supra anguste canaliculato suffulta. *Inflorescentia* terminalis, pedunculo communi ad 2 cm. longo incluso ad 14 cm. longa, rhachi sparse breviter pubescente ; pedicelli ad 2 mm. longi, subsericei, apice bracteolis tribus quarum mediana ad 2·5 mm. longa lateralibus circa 1 mm. longis dorso sparse subsericeis instructi. *Receptaculum* circa 1·25 mm. longum, breviter sericeum, saepe distincte canaliculatum. *Calyx* vix 1·5 mm. longus, tubo brevi, lobis late deltoideis subacutis, dorso sparse adpresse pubescens. *Petala* alba (ex *Kerr*), linearia, obtusa, 8·5 mm. longa, pluricostata, dorso pilis brevibus sericeis adpressis sparse instructa, intra nisi inferne breviter crasse pilosa. *Filamenta* 3·25 mm. longa, pilosa, antheris linearibus

2·75 mm. longis. *Stylus* 6·75 mm. longus, superne pilis paucis brevibus instructus.

Kaw Samui, 200 m., evergreen forest, *Kerr* 12561.

Polyosma oblonga *Craib* [Saxifragaceae-Escallonieae]; a *P. conocarpa* Ridl. et *P. mutabile* Blume drupa ambitu oblonga, endocarpio apice obtuso vel obtuse subacuminato nequaquam acuto recedit.

Arbor circa 7 m. alta (ex *Kerr*); ramuli novelli sicco adpresse fulvo-pubescentes, cito glabrescentes, fusco-corticati, lenticellis conspicuis haud numerosis. *Folia* oblongo-oblanceolata, subellipticooblonga, rarius late oblanceolata, apice acuminata, primo apiculata, basi cuneata, haud rarius parum inaequilateralia, 7–14·5 cm. longa, 2·5–5·5 cm. lata, chartacea, sicco supra plus minusve fuscescentia, subtus flavo-viridia, supra glabra vel ad costam puberula, subtus ad costam nervosque adpresse pubescentia, aliter pilis sparsis adpressis instructa, matura parum glabrescentia, nervis lateralibus utrinque 10–12 intra marginem anastomosantibus supra plus minusve conspicuis subtus subprominentibus, costa supra impressa subtus prominente, margine integra, hic et illic interdum pauperius ciliata, petiolo 1–2 cm. longo supra anguste canaliculato indumento ei ramulorum simili tecto suffulta. *Infructescentia* terminalis, circa 11 cm. longa, rhachi adpresse vel subadpresse fulvo-pubescente. *Drupa* purpureo-atra (ex *Kerr*), sicco atra, ambitu oblonga, basi truncata vel rotundata, parum gibbosa, apice rotundata, styli basi persistente apiculata, calyce persistente, circa 11 mm. longa et 6 mm. diametro, pedicello 4–6 mm. longo plus minusve adpresse pubescente apice bracteolis tribus persistentibus instructo suffulta, endocarpio ambitu oblongo apice valde obtuso vel obtuse acuminato basi truncato gibboso longitudinaliter 8-sulcato sulcis duobus aliis multo magis conspicuis iugis rotundatis haud acutis.

Nakawn Sritamarat, Sichon, under 50 m., evergreen forest, *Kerr* 15673.

Kalanchoe longifolia *Geddes* [Crassulaceae]; a *K. Crabii* Hamet inflorescentia multo longiore indumento laxiore tecta, floribus longioribus, carpellis brevioribus recedit.

Herba perennis, erecta, caule solitario vel caulibus pluribus simplicibus 20–60 cm. altis basi ad 1·5 cm. diametro apice viridibus puberulis inferne purpurascentibus glabris. *Folia* opposita, simplicia vel rarius trisecta; folia vel foliola inferiora ovato-lanceolata, superiora lanceolata vel lineari-lanceolata, apice obtusa, parum indurata, basi marginibus saepe inflexa, cuneata vel rotundata, supra glabra, subtus primo pilis glanduloso-capitatis puberula, cito glabra, 7·5–14 cm. longa, 3·5–6 cm. lata, pagina utraque viridia, valde crassa, costa lata subtus prominente, nervis lateralibus obscuris circa 4 inferioribus obliquis, margine crassius obtuse denticulata vel serrata, petiolo 2·5–7 cm. longo supra conspicue

canaliculato basi complanato caulem amplectente primo pilis glanduloso-capitatis puberulo cito glabro suffulta. *Inflorescentia* terminalis, usque ad 15 cm. longa ; pedicelli 5 mm. longi, virides, pilis brevibus glanduloso-capitatis instructi. *Sepala* 4, viridia, basi inter se brevissime connata, lineari-lanceolata, apice subacuta, 8 mm. longa, 2 mm lata, pagina utraque et margine pilis brevibus glanduloso-capitatis instructa. *Corollae* tubus 1·3 cm. longus, extra basi viridis, superne pallide viridis, extra pilis brevibus glanduloso-capitatis instructus, intra glaber, inferne 4·5 mm. diametro, apice distincte 4-angulatus, 2 mm. diametro, lobi 4, citrini, oblongo-oblanceolati, apice conspicue acuminati, circa 8 mm. longi, 4 mm. lati, supra glabri, infra pilis brevibus glanduloso-capitatis sparse instructi, margine apicem versus saepe anguste pauci-crenulati. *Stamina* 8, biseriata, 4 inferiora alternipetala, circa 9 mm. supra corollae tubi basem inserta, 4 oppositipetala circa 1 mm. altius inserta, eorum antheris ad os tubi attingentibus, filamentis ad 1 mm. longis glabris, antheris parvis pallide viridibus. *Pistillum* glabrum, 9 mm. altum, carpellis viridibus nitidis, stylis pallidis, stigmatibus parvis, squamis subulatis ad 4 mm. longis.

Lôi, Wang Sapung, 300 m., limestone rocks, *Kerr* 8775. Described from plants raised from seed of above collection which flowered at Aberdeen in February, 1928.

Combretum annulatum *Craib* [Combretaceae-Combreteae] ; a *C. squamoso* Roxb. eiusque affinioribus foliis ternatis interdum alternis basi saepissime cordatulis, fructu, alis inclusis, ambitu late elliptico recedit.

Frutex volubilis (ex *Kerr*) ; ramuli cortice pallide brunneo vel cinereo obtecti, lenticellis paucis parvis prominulis sed vix conspicuis. *Folia* ternata vel interdum alterna, saepissime oblongo-elliptica, acuminata, basem versus angustata, ima basi cordatula vel truncata, usque ad 19 cm. longa et 9·5 cm. lata, rigide chartacea vel subcoriaceo-chartacea, sicco viridia vel saepissime plus minusve brunnescentia, matura supra verruculosa, subtus squamosa, squamis parvis nisi ad costam nervosque laterales ubi saepe contiguis inter se sat distantibus, nervis lateralibus utrinque 9 intra marginem anastomosantibus supra conspicuis subtus prominentibus, nervis transversis supra plus minusve conspicuis subtus magis conspicuis vel subprominulis, margine integra, recurva, petiolo 6–10 mm. longo supra canaliculato suffulta. *Spicae* fructiferae axillares, solitariae, ex axillis foliorum alternorum ortae vel ad apices ramulorum ubi folia ternata paniculam foliatam formantes, pedunculo communi circa 3 cm. longo incluso ad 10 cm. longae, et pedunculo et rhachi squamis instructis. *Fructus* alis inclusis late ellipticus, apice subtruncatus, styli basi persistente apiculatus, basi rotundatus vel truncatus, acuminatus, 4 cm. longus, 3·3 cm. latus, ubique squamulosus.

Chumpawn, Ta Ngaw, 100 m., evergreen forest, *Kerr* 11488.

Combretum quadratum *Craib* [Combretaceae-Combreteae]; ramulis quadrangularibus *C. quadrangulari* Kurz et *C. procurso* Craib affine, ab ambobus spicis paniculam foliatam terminalem formantibus recedit.

Frutex circa 4 m. altus (ex *Kerr*); ramuli iuventute quadrangulares, densius pallide squamulosi, mox teretes, pallide brunneo-corticati, lenticellis haud conspicuis. *Folia* opposita vel subopposita, oblongo-elliptica, oblongo-ovata, vel suboblonga, apice obtuse acuminata vel subacuminata, basi cuneata, haud rarius rotundata vel acuminata, 5–9 cm. longa, 2·5–4·5 cm. lata, matura rigide chartacea, sicco supra subplumbea, subtus pallide viridia, pagina utraque dense squamulosa, nervis lateralibus utrinque circa 6 supra conspicuis subtus prominulis marginem versus evanidis, nervulis omnino obscuris, petiolo ad 1 cm. longo supra canaliculato primo dense squamuloso suffulta. *Spicae* paniculam terminalem ad 15 cm. longam formantes, pedunculo communi circa 1·5 cm. longo incluso circa 2 cm. longae, pedunculo quadrangulari dense pallide squamuloso, ex axillis bractearum foliacearum lanceolatarum oblongo-lanceolatarum vel ovato-lanceolatarum apice acuminatarum basi cuneatarum vel acuminatarum 1–2 cm. longarum 0·4–1·2 cm. latarum petiolo 5–6 mm. longo suffultarum ortae. *Fructus* primo plus minusve ellipticus, fere maturus rotundatus vel oblato-rotundatus, alis 4 tenuibus inclusis ad 2·5 cm. diametro, squamulosus.

Korat, Kao Lêm, 1300 m., scrub on summit, *Kerr* 9950.

Eugenia anacardifolia *Craib* [Myrtaceae-Myrteae]; ab affini *E. javanica* Lamk. foliis basi latioribus nervis lateralibus magis robustis et praesertim inflorescentia ramosa recedit.

Arbor circa 8 m. alta (ex *Kerr*), glabra; ramuli sat crassi, iuventute pallidi, paulo compressi, cito pallide brunneo-corticati, ad nodos parum complanati, aliter teretes, lenticellis haud conspicuis. *Folia* opposita vel subopposita, oblonga, late lanceolato-oblonga, vel oblanceolato-oblonga, apice obtuse acuminata, basi auriculato-cordata, saepe inaequilateralia, ad 25 cm. longa et 7·5 cm. lata, chartaceo-coriacea, saepissime sparse pellucido-punctata, subtus pallidiora, subglauca, nervis lateralibus utrinque circa 14 supra saepe parum impressis subtus prominentibus fere semper rectis, nervis transversis paucis subtus prominulis, costa supra impressa subtus prominente, nervo intramarginali subtus prominente 5–7 mm. intra marginem posito, petiolo 5–10 mm. longo valido primo supra late canaliculato mox subplano suffulta. *Inflorescentia* terminalis, axillaris, vel ex axillis foliorum delapsorum orta, e basi ramosa, ad 4 cm. longa, ramis lateralibus infimis ad 4 cm. longis; pedicelli (infra articulationem) 5 mm. longi vel cymulae floris terminalis haud evoluti; bracteae omnes deciduae. *Receptaculum* sub anthesin 1 cm. longum, apice late campanulatum, supra ovarium distincte productum, dimidio inferiore pedicellum sat validum simulans. *Sepala* 4, paulo post anthesin persistentia, ad 7·5 mm. longa, conspicue glanduloso-punctata. *Petala* 4, inter se libera,

circa 1·2 cm. longa, conspicue glanduloso-punctata. *Stamina* ad 1·7 cm. longa, antheris circa 0·8 mm. longis.

Langsuan, Kao Nom Sao, 600 m., evergreen forest, flowers pink, *Kerr* 12081.

Eugenia angkae *Craib* [Myrtaceae-Myrteae]; ab *E. toddalioide* Wight foliis tenuioribus maioribus longius petiolatis distincta.

Arbor circa 8 m. alta (ex *Kerr*), glabra; ramuli graciles, primo pallidi, mox cortice pallide brunneo vel rubro-brunneo obtecti. *Folia* opposita, oblonga vel oblongo-elliptica, apice obtuse caudato-acuminata, basi cuneata vel rotundato-cuneata, interdum parum inaequilateralia, 9–13 cm. longa, 4–6 cm. lata, chartacea, pellucido-punctata, costa supra impressa subtus prominente, nervis lateralibus utrinque numerosis inter se parallelis supra plus minusve subconspicuis subtus subprominulis, nervis transversis paucis supra vix conspicuis subtus fere subprominulis, nervo intramarginali vix 1 mm. intra marginem distincte cartilagineam posito, petiolo 6–11 mm. longo supra canaliculato suffulta. *Cymae* axillares. *Fructus* vix maturus subglobosus, ad 1·3 cm. diametro, receptaculi tubo et interdum calycis lobis coronatus.

Doi Angka, 1300 m., dense evergreen forest, *Kerr* 5287.

Eugenia quadrialata *Craib* [Myrtaceae-Myrteae]; ab affini *E. pseudotetraptera* King cymis axillaribus, floribus haud dense glomerulatis recedit.

Arbor circa 7 m. alta (ex *Kerr*), glabra; ramuli straminei, 4-alati, alis iuventute arcte undulatis cito rectis saltem per annos duos saepissime persistentibus circa 1 mm. latis. *Folia* opposita, oblonga vel oblongo-lanceolata, apice longius acuminata, subobtusa, basi rotundata, rarius cuneato-rotundata, 5–10 cm. longa, 2–4 cm. lata, rigide chartacea, sicco viridia, subtus parum pallidiora, subtus ad costam pauci-punctata, costa supra impressa subtus prominente, nervis lateralibus patulis vel oblique patulis utrinque circa 12 aliis tantum paulo minus conspicuis interspersis inter se parallelis et saepissime circa 5 mm. distantibus prope marginem nervum intramarginalem formantibus supra impressis subtus prominentibus, nervulis supra obscuris subtus paucis plus minusve conspicuis, margine integra, parum revoluta, anguste cartilaginea, petiolo 2–3 mm. longo transverse corrugato vel subtus verrucoso-tuberculato suffulta. *Inflorescentia* cymosa, axillaris, pedunculo communi circa 1 cm. longo incluso circa 3 cm. longa, cymis ultimis subsessilibus e floribus tribus pedicellis basi articulatis ad 2 mm. longis suffultis constitutis, pedunculo cum rhachi 4-alato ima basi bracteis lanceolatis subulato-acuminatis 4 mm. longis rigidis persistentibus et paululo superius bracteis latioribus tenuioribus deciduis instructo, bracteis apud cymulas deciduis; flores albi (ex *Kerr*). *Receptaculum* pallidum, irregulariter longitudinaliter corrugatum, parce punctatum, circa 4 mm. longum et 2·5 mm. diametro, supra ovarium distincte productum. *Calycis* segmenta 5, rotundata, 1·5 mm. longa, basi

1·6 mm. lata, irregulariter decidua. *Petala* calyptratim decidua. *Discus* conspicuus. *Stylus* 1 cm. longus. *Ovarium* 2-loculare.

Surat, Klawng Nam Wing, 100 m., evergreen forest, *Kerr* 12238.

Eugenia referta *Craib* [Myrtaceae-Myrteae]; species inflorescentiis ex axillis annotinis ortis quam foliis multo brevioribus ab *E. toddalioide* Wight nervulis rete gracile quam nervis lateralibus tantum paululo minus conspicuum efficientibus recedens.

Frutex vel *arbor* parva (ex *Kerr*); ramuli annotini cinerei vel pallide brunneo-cinerei, primo parum complanati, mox teretes, lenticellis haud conspicuis. *Folia* opposita vel subopposita, saepissime suboblonga, oblongo-elliptica vel elliptica, apice acuminata vel subacuminata, summo apice obtusa, costa parum excurrente primo apiculata, basi cuneata vel rotundata, 5·5–9 cm. longa, 2–4·3 cm. lata, rigide chartacea, glabra, sparse inconspicue punctata, nervis lateralibus utrinque numerosis inter se parallelis supra prominulis subtus paulo magis prominulis pagina utraque quam rete tantum paululo magis prominulis, nervis intramarginalibus duobos altero apud marginem altero magis prominulo 1–1·5 mm. intra marginem, margine anguste cartilaginea, paululo recurva, petiolo 5-9 mm. longo supra canaliculato suffulta. *Cymae* in ramulis annotinis axillares, petiolos vix superantes vel ad 3 cm. longae, glabrae, breviter pedunculatae; bracteae squamiformes, deciduae; flores albi (ex *Kerr*), sessiles. *Receptaculum* turbinatum, 3 mm. longum, apice 4 mm. diametro, supra ovarium distincte productum. *Calycis* lobi deltoidei, circa 1 mm. longi, decidui. *Corolla* ut videtur calyptratim decidua. *Stamina* 5 mm. longa, antheris parvis. *Stylus* 6 mm. longus; ovarium 2-loculare.

Kanburi, Wangka, 200 m., among limestone rocks, *Kerr* 10472.

Eugenia rigens *Craib* [Myrtaceae-Myrteae]; species nova inter species floribus mediocribus et petalis inter se liberis foliis coriaceis nervis paucis conspicuis floribus sessilibus receptaculo turbinato longitudinaliter rugato distincta.

Arbor circa 10 m. alta (ex *Kerr*), glabra; ramuli iuventute sicco fusci, parum complanati, mox teretes, sat crassi, cortice cinereo vel brunneo-cinereo obtecti, lenticellis obscuris. *Folia* opposita, saepissime elliptica vel oblongo-elliptica, apice acuminata vel caudato-acuminata, basi cuneata, acuminato-cuneata, vel rotundato-cuneata, interdum inaequilateralia, 6·5–14 cm. longa, 3–7·3 cm. lata, coriacea, epunctata vel pagina utraque punctis paucis rarius notata, nervis lateralibus utrinque circa 8 paucis aliis tantum paululo minus conspicuis additis infimis obliquis supremis plus minusve patulis supra interdum paululo prominulis interdum parum impressis subtus prominentibus, nervis transversis vix conspicuis, nervis intramarginalibus duobus altero paulo intra marginem altero robustiore 3–7 mm. intra marginem, margine recurva, petiolo 5–12 mm. longo supra canaliculato suffulta. *Inflorescentia* cymosa, 4·5 cm. longa, pedunculo communi circa 5 mm. longo suffulta, cymularum

pedunculis 1 cm. longis, et rhachi et pedunculis obtuse angulatis, floribus albis (ex *Kerr*) sessilibus. *Receptaculum* late turbinatum, circa 1 cm. longum et apice 1·2 cm. diametro, inferne saepissime plurisulcatum, supra ovarium conspicue productum. *Calycis* segmenta oblato-rotundata, circa 6 mm. longa et 9 mm. lata. *Petala* inter se libera, oblata, circa 7 mm. longa et 11 mm. lata. *Stamina* 1 cm. longa, antheris paulo ultra 1 mm. longis. *Stylus* 1·5 cm. longus; ovarium 2-loculare.

Langsuan, Kao Nom Sao, 900 m., evergreen forest, *Kerr* 12045.

Eugenia subrigens *Craib* [Myrtaceae-Myrteae]; ab *E. rigente* Craib foliis tenuioribus floribus minoribus recedit.

Arbor circa 15 m. alta (ex *Kerr*), glabra; ramuli graciles vel subgraciles, primo parum complanati, cortice laevi pallide brunneo vel cinereo-brunneo obtecti. *Folia* opposita, elliptico-oblonga, ovato-oblonga, vel subelliptica, apice longius obtuse acuminata, basi cuneata vel acuminata, saepe parum inaequilateralia, 7·5–12 cm. longa, 2·8–5·8 cm. lata, subcoriacea, epunctata, nervis lateralibus utrinque 6–8 paucis aliis paulo minus conspicuis interiectis rectis supra sat conspicuis subtus prominentibus, costa supra impressa subtus prominente, nervis transversis rete supra tantum iuventute subconspicuum subtus prominulum efficientibus, nervis intramarginalibus duobus altero fere ad marginem altero robustiore saepissime 4–5 mm. intra marginem posito, margine recurva, petiolo 8–10 mm. longo supra mox late haud alte canaliculato suffulta. *Inflorescentia* in ramulis annotinis axillaris, cymosa, usque ad 4 cm. longa, e basi ramosa vel breviter pedunculata; flores albi (ex *Kerr*), sessiles. *Receptaculum* turbinatum, praesertim inferne plus minusve sulcatum, 8 mm. longum, apice circa 8 mm. diametro. *Calycis* segmenta decidua, exteriora oblata, apice truncata, vix 3 mm. longa, 4 mm. lata. *Petala* sub anthesin libera, subrotundata, circa 5 mm. diametro. *Stamina* circa 9 mm. longa, disco sat conspicuo inserta. *Ovarium* 2-loculare.

Pattani, Kao Kalakiri, 900 m., evergreen forest, *Kerr* 14961.

Eugenia subviridis *Craib* [Myrtaceae-Myrteae]; ab *E. tetragona* Wight ramulis iuventute complanatis et angulatis sed haud acute quadrangularibus, petiolis longioribus, pedunculis crassioribus recedit, *E. Hemsleyanae* King etiam parum similis sed nervis lateralibus minus prominentibus et intra marginem minus conspicue anastomosantibus distinguenda.

Arbor circa 12 m. alta (ex *Kerr*), glabra; ramuli crassi, primo complanati, angulati, mox teretes, cortice brunneo vel fusco-brunneo obtecti, lenticellis parvis vix numerosis vel conspicuis. *Folia* opposita vel subopposita, ad apicem ramuli unius subternata, oblongo-obovata, oblonga, vel lanceolato-oblonga, basi cuneata, 14–26 cm. longa, 6·5–10 cm. lata, rigide chartacea vel subcoriacea, sicco supra fuscescentia, subtus saepissime brunnescentia, sparse pellucido-punctata, nervis lateralibus utrinque 12–15 paucis aliis

tantum paulo minus conspicuis additis, supra sat conspicuis subtus prominentibus, costa supra impressa subtus prominente, nervis transversis paucis pagina utraque subconspicuis vel superiore fere obscuris, nervo intramarginali supra subconspicuo subtus prominulo 2–3 mm. intra marginem posito, margine recurva, petiolo 2–2·8 cm. longo supra canaliculato suffulta. *Inflorescentia* in ramulis annotinis axillaris, saepissime 4–6 cm. longa et ex ima basi ramosa pedunculos fasciculatos simulans ; cymulae ultimae e floribus tribus parvis subviridibus (ex *Kerr*) sessilibus constitutae ; alabastra clavata, circa 5 mm. longa. *Calycis* segmenta parva. *Petala* inter se libera, subrotundata, 2·5–2·75 mm. diametro. *Ovarium* 2-loculare.

Doi Sutep, 1550 m., evergreen forest, *Kerr* 3503.

Eugenia Winitii *Craib* [Myrtaceae-Myrteae] ; ab *E. cuneata* Wall. foliis longioribus, ab *E. khasiana* Duthie et *E. fluviatili* Hemsl. quibus habitu similis ramulis conspicue quadrangulis vel iuventute subalatis recedit.

Frutex 5-metralis (ex *Winit*), glaber ; ramuli acute 4-angulati vel iuventute subalati, cortice brunneo vel fusco-brunneo obtecti, lenticellis haud conspicuis. *Folia* opposita vel subopposita, lanceolata vel anguste oblongo-lanceolata, apice obtuse acuminata vel subacuminata, basi cuneata, 6–12·5 cm. longa, 1·8–2·3 cm. lata, subcoriacea, glabra, parce punctata, costa supra impressa subtus prominente, nervis lateralibus utrinque numerosis inter se parallelis intra marginem anastomosantibus pagina neutra valde conspicuis, margine integra, recurva, petiolo circa 5 mm. longo supra canaliculato suffulta. *Cymae* paniculatae, et axillares et terminales, pedunculo communi usque ad 1·5 cm. longo incluso 5–8 cm. longae, glabrae, pedunculo cum rhachi et ramulis stramineo conspicue angulato vel subalato, cymis ultimis trifloris, floribus sessilibus ; bracteae deciduae, circa 1 mm. longae ; alabastra 4 mm. longa. *Receptaculum* 3 mm. longum, apice vix 4 mm. diametro, supra ovarium distincte productum. *Calyx* undulatus, lobis vix evolutis. *Petala* calyptratim decidua. *Stamina* ad 4 mm. longa, filamentis apice angustatis, antheris parvis glandula minuta apice notatis. *Ovarium* 2-loculare.

Nan, Mê Sanian, 400 m., rocky bed of stream, *Winit* 1787.

Barringtonia bicolor *Craib* [Lecythidaceae] ; a *B. Schmidtii* Craib foliis maioribus subtus breviter crispatim pubescentibus vel saltem conspicue puberulis, receptaculi indumento pallido haud ferrugineo inter alia recedit.

Arbor 10–15 m. alta (ex *Kerr*) ; ramuli iuventute brunneo-rubri, densius breviter pubescentes, cito puberuli, annotini cortice brunneo vel cinereo-brunneo obtecti, lenticellis haud numerosis longitudinaliter elongatis. *Folia* apices versus ramulorum aggregata, saepissime oblongo-obovata vel obovata, apice breviter obtuse acuminata vel valde obtusa, vel obovato-oblanceolata, apice acute acuminata, basi longius acuminato-cuneata vel cuneata, 8–19 cm. longa,

3·5–9 cm. lata, sicco viridia, subtus pallidiora, rigide chartacea, pagina superiore glabra, inferiore ad costam nervosque laterales densius breviter pubescentia, aliter sparsius breviter pubescentia vel puberula, nervis lateralibus utrinque circa 14 supra conspicuis subtus prominentibus rectis vel subrectis intra marginem anastomosantibus, nervulis rete conspicuum formantibus, margine nisi inferne serrulata, petiolo 1–1·5 cm. longo dense puberulo supra late canaliculato suffulta. *Spicae* terminales, ramulos hornotinos terminantes vel rarius etiam paucae axillares, ad 25 cm. longae, pedunculo communi circa 1 cm. longo basi bracteis parvis dense tecto cum rhachi dense griseo-puberulo suffultae; bracteae lineari-lanceolatae, acutae, circa 3 mm. longae, pallide virides; alabastra sessilia, circa 4 mm. longa, dense griseo-puberula. *Receptaculum* calyce paulo brevius. *Calycis* segmenta rotundata, ciliata. *Corolla* ante anthesin viridis. *Fructus* ambitu oblongus, parum obtuse angulatus, ad 2·5 cm. longus et 1·2 cm. latus, glaber vel parum puberulus, calyce persistente coronatus, 1–2-locularis.

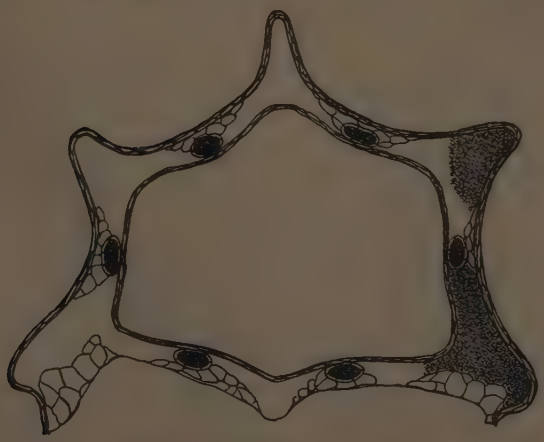
Nakawn Tai, 200 m. mixed deciduous forest, *Kerr* 5874. Nakawn Sawan, Klawng Kung, 200 m., mixed deciduous forest, *Kerr* 5874A.

XXII.—LILAEOPSIS IN TASMANIA AND NEW ZEALAND.

A. W. Hill.

Lilaeopsis Gunnii *A. W. Hill*, sp. nov.; species foliis subulatis fructibus magnis conspicue costatis distincta.

Herba caespitosa; rhizoma repens. *Folia* 4–5 cm. longa, lineari-lanceolata, subulata. *Umbella* 6–8-flora, pedunculi breves, pedicelli 1·5–2 cm. longi. *Fructus* ellipticus vel ovoideus, 3 mm.



Lilaeopsis Gunnii A. W. Hill.
Transverse section of fruit. × 60.

longus, 1·75 mm. latus, costis 10, distinctis acutis in sectione transversali omnibus conspicue lignosis prominentibus, vittae 6, quarum 2 commissurales.

TASMANIA. Formosa, in marshy spots (2.12.1848), *Gunn in Herb. N.S. Wales* (*Sydney*) : Lake Elizabeth, by Great Lake, 3300 ft., *L. S. Gibbs* 6782.

Mr. Clive Lord of the Dominion Museum, Hobart, informs me that ' Formosa ' is the name of an estate about 4 miles south of Cressy. It is under the Western Tiers and bounded in part by the Lake River. Cressy is in the Northern Midlands, north-west of Ross.

Gunn's specimens collected in the year 1848 have thin, subulate ' leaves ' running to points, which is unusual in the Australian specimens.

Gunn has a note that the plant " buries the fruit in mud in growing as indicated in the specimens."

The plants form small tufts, and the long peduncles are bent over and bring the elongated, sharply-ribbed fruits into contact with the mud in which the plants are growing.

L. Rodway in his " Tasmanian Flora " (1903), pp. 66, 67, mentions several localities in Tasmania for ' *Crantzia lineata*,' but unfortunately he does not quote the collectors ; apparently he did not know of these specimens collected by Gunn in 1848.

Gunn also collected specimens on December 23rd, 1844, at St. Patrick's River, Launceston, on December 24th, 1844, at a marsh, Launceston, and again in 1845 on January 17th at Arthur's Lakes, and on December 18th, 1845, at Penguite, but all under the number 2008.

One of these, apparently that collected at Arthur's Lakes, bears fruit, and the fruits are those of *Lilaeopsis Brownii* ; these are the only specimens of Gunn's collecting at Kew.

Reference to these specimens was made in the Journ. Linn. Soc., xlvii, p. 546, under *L. Brownii*, and two other specimens collected by L. S. Gibbs were also, in the absence of fruits, doubtfully referred to this species.

One of these, from Lake Elizabeth, by Great Lake, from the subulate character of the ' leaves ' (*No.* 6782 *in Herb. Kew*), should possibly be referred to this new species.

With reference to the genus *Lilaeopsis* in New Zealand it may be useful to put on record the following determinations of specimens from the Dominion Museum Herbarium, collected by Mr. D. Petrie, which were sent to Kew for examination by Mr. W. R. B. Oliver, Director of the Dominion Museum, Wellington.

(1) *L. orbicularis* A. W. Hill (*K.B.* 1928, p. 266).
Two specimens, one from Manganui Bluff, the other from North of Kaihu, Auckland Peninsula, by sea beach.

(2) *L. lacustris* A. W. Hill. Five specimens.

1. Karekare, Waitakerei, West Auckland. 2. Thames, muddy coastal flats. 3. Macrae's Waihemo County, 1800 ft. 4. Hobson Bay, Auckland. 5. Hot streams near Terraces Hotel, Lake Taupo.

The determinations of Nos. 2–5 are not absolute, owing to the absence of fruits.

(3) *L. novae-zelandiae* (Gandog.) A. W. Hill. Six specimens. 1. Cape Foulwind, S.W. Nelson. 2. Near Waikouaiti, E. Coast Otago. 3. Waitahuna near Lawrence, Otago. 4. Bluff, Southland, by beach. 5. N. Heads, Otago Harbour. 6. Petie Bay, Chatham Is.

Nos. 3–5 were without fruits, but appear to belong to this species. The last specimen, from Chatham Island, was collected by Mr. Oliver.

XXIII.—DECADES KEWENSES Plantarum Novarum in Herbario Horti Regii Conservatarum. DECAS CXXIII.

1221. **Viola fruticosa** *W. Bckr.* [Violaceae § *Leptidium* Ging. emend. Bckr.]; a *V. stipulari* Sw. foliis anguste lanceolatis, brevissime petiolatis, subsessilibus, aequaliter plane crenatis (utrinque 5–10 crenis), haud acuminatis valde differt. Species distinctissima.

Frutex humilis, circiter 20–25 cm. altus. *Radix* lignosa, ramosa, haud crassa. *Stirps* lignosa, rotunda, ramosa, ramis foliaceis et floriferis plus minusve elongatis. *Folia* glaberrima, crassiuscula, anguste lanceolata, subsessilia, brevissime petiolata, haud acuminata, aequaliter plane serrata, 1·5–3 cm. longa et 4–7 mm. lata, subdense disposita. *Stipulae* fuscae, anguste lanceolatae, longifimbriatae, internodia haud 1 cm. longa fere aequantes, vel potius breviores, 5–7 mm. longae. *Flores* ad ramorum fines dispositi, parvi, 5–6 mm. longi; pedicelli tenues, basi bracteolati, folia superantes. *Sepala* angustissime subulata, brevissime appendiculata; corolla ceterum notis sect. *Leptidium*, brevissime calcarata. *Capsula* ellipsoidea; semina ovoidea, laevia.

South America. Without exact locality, herb. *Lehmann No. Kew* 22. Probably from the Andes of Venezuela or Colombia.

1222. **Geranium azorelloides** *Sandwith* [Geraniaceae-Geranieae]; affinis sect. *Andina* R. Knuth, *G. cucullato* H.B.K., foliis ambitu oblongis vel obovato-oblongis, vix ad medium simpliciter trilobatis tantum, crasse coriaceis subnitentibus, margine apice setifero excepto eciliatis, petiolis brevioribus primo visu distinguitur.

Planta perennis humillima. *Caudex* inferne nudus circiter 1 mm. diametro, sursum stipulis castaneis petiolisque dense obtectus igitur 3–7 mm. diametro, simplex vel nonnunquam ramosus, apice caespitem foliorum florumque 2–3 cm. diametro formans. *Stipulae* castaneae scariosae glabrae 8–10 mm. longae, petiolo inferne fere ad tertiam partem adnatae, parte libera anguste lanceolatae atque longe acuminato-aristatae. *Folia* petiolo superne dense adpresse retrorso-piloso 6–7 mm. longo; lamina ambitu oblonga vel obovato-

oblonga, 6–9 mm. longa, apice 2–5 mm. lata, basi subrotundata, apice ultra $\frac{1}{3}$ sed vix ad medium profunde simpliciter trilobata, lobo medio laterales superante, lobis omnibus anguste triangulari-lanceolatis obtusis sed setis albis 1–2 conspicuis 0·5–1 mm. longis terminatis, crassa coriacea subnitens, setis exceptis glaberrima, supra nervis 3–5 (plerumque 3) palmatis conspicuis. *Flores* petalis exceptis folia aequantes neque superantes; pedunculi solitarii uniflori, pilis albis retrorsis adpressis obtecti, circiter 7 mm. longi. *Sepala* oblongo-lanceolata, 7–8 mm. longa, fere ad apicem margine rubro-fusco scarioso pilis antrorsis ciliata, apice ipso incrassato rostriformi immarginato inferne intus fasciculo pilorum minimorum praedito atque setis 1–2 eis foliorum similibus terminato. *Petala* obovata unguiculata, apice emarginata, calyce duplo longiora igitur circiter 1·4 cm. longa, lamina 3–4 mm. lata, verisimiliter rosea, nervis 5–7 intensius coloratis notata. *Fructus* rostro pilosulo calycem aequante vel superante.

Colombia. Cauca; Páramo de Guanacas, prov. Popayan, 3200 m., November 1882, *Lehmann* 2139.

Lehmann did not, apparently, collect more than enough for a single set of this extremely distinct little plant.

1223. **Chisocheton rigidus** *Ridl.* [Meliaceae]; affinis nulli specie arcte, foliis alternis coriaceis, panicula brevi floribus eos *Dysoxyli* simulantibus, sed disco quam ovario breviore hirto.

Arbor, foliis glabris, ultra 45 cm. longis, foliolis 5 dissitis alternis coriaceis politis obovatis acutis basibus cuneatis inaequilateris nervis prominentibus subtus 8-paribus inarcuantibus nervulis conspicuis subparallelis copiosis, 15–20 cm. longis 8·5–9 cm. latis petiolulis incrassatis 1 cm. longis, *paniculis* lateralibus 8 cm. longis pubescentibus, bracteis ovatis acutis pubescentibus, *calyce* 3–4 lobo lobis ovatis acutis pubescentibus 4 mm. longis, *petalis* 5 oblongis obtusis pubescentibus 5 mm. longis, *staminum* tubo cylindrico petalis vix longiore, vix dentato extra pubescente, antheris oblongo-linearibus 10, disco breviter tubuloso hirto, ovario conico longiore, *stylo* validulo, stigmate pulviniformi glabro, *capsula* (immatura) subglobosa 2·5 cm. lata.

Malay Peninsula. Pahang, Temerloh, Kemansul Reserve, *Forest Ranger Hamid* 10880. Native name "Kulim Gajah." Johor, Castlewood, *Ridley* 12492. Selangor, Welds Hill, Kuala Lumpur, *A. Rahman* 2829.

The flowers are short like those of a *Dysoxylon* and in short stout panicles much shorter than the leaves, the leaflets are few, coriaceous and alternate, the disc is shorter than the ovary and hairy.

1224. **Schoepfia velutina** *Sandwith* [Olacaceae-Olaceae]; indumento brevi denso ramulorum et praesertim foliorum subtus mollium tactu velutinorum distinctissima.

Frutex 1·2 m. altus; ramuli teretes, tenuissime striati, 30 cm. infra apicem 3–4 mm. diametro, passim (etiam senectute) breviter

dense pilosuli vel tomentelli; internodia 2–4 cm. longa. *Folia* alterna, anguste lanceolata ad ovato- lanceolata, apice longe acute acuminata, basi etiam attenuata cuneata, 8–11·5 cm. longa, 2–4 cm. lata, integerrima, chartacea, supra olivacea sed senectute nigrescentia, subnitida, tenuiter reticulata, ceterum venatione ut in aliis speciebus, costa dense molliter tomentella, ceterum glabrescentia sed sparse minute pilosula, subtus passim molliter griseo-velutina tomentella; petiolus brevissimus 1–3 mm. longus, indumento ei costae simili praeditus. *Racemi* axillares plerumque 2–4 fasciculati brevissimi ad 1·5 cm. longi; pedunculus pedicellique minuti indumento ramulorum foliorumque induti. *Flores* subsessiles in quoque racemo vulgo 4–8, trimeri tetrameri vel rarius pentameri. *Calyx* acute triangulariter 3–5-lobatus, extra indumento eodem ramulorum praeditus. *Discus* hypogynus turbinatus glaberrimus, margine undulato-sinuato, 1 mm. altus, ad 1·5 mm. diametro. *Corolla* ericaceo-campanulata vel urceolata, cum lobis 4–5 mm. longa, basi 3 mm. lata, extra glaberrima atque siccitate fusco-rubra, intus glabra fasciculo pilorum pone antheram quamque excepto; lobi 3–5 triangulares, maturitate patulo-recurvati, ad 1·5 mm. longi, basi ad 2 mm. lati, intus margine obscure puberulo atque siccitate grisei. *Stamina* 3–5 fauce corollae sub lobis inserta; antherae fere sessiles; filamenta cum parte libera brevissima ad 0·2 mm. tantum longa. *Ovarium* rugulosum, prope apicem umbilicatum obscure minute puberulum, fere ad 1 mm. altum, ad 1·5 mm. diametro; stylus glaber, cum stigmate capitato 1·5–3 mm. longus. *Fructus* drupaceus glaber nigrescens, obovoideus, ad 1·3 cm. longus, circiter 7 mm. diametro, annulo disci apicali ad 3 mm. diametro.

Brazil. Matto Grosso: near the source of the Rio Paraguay (Rio Amolar), Diamantino, on rocky soil in forest at 2000 ft., May 1927, *Miss Gwen Dorrien Smith* 200. "Shrub 4 feet high; flowers green."

1225. **Pseudoeugenia tenuifolia** *Ridl.* [Myrtaceae]; affinis *P. perakiana* Scort., foliis multo tenuioribus nervis paucioribus distincte differt.

Arbor ramulis albis, *foliis* membranaceis lanceolatis longecaudatis basi acuminatis, nervis ad 20-paribus in margine inarcuantibus 11 cm. longis 3 cm. latis, petiolis 1 cm. longis gracilibus, *floribus* minutis axillaribus paucis pedicellis 2 mm. longis, *sepalis* 4 ovatis, *petalis* vix longioribus rotundatis, *staminibus* 8 ad 10, filamentis brevibus sepala non superantibus, antheris subglobosis.

Malay Peninsula. Pahang, Temerloh Kemansul Reserve, *Forest Ranger Hamid* 10556. Native name "Serai Kayu."

This is unlike any species known to me in its thin membranous leaves and few nerves. *P. perakiana* Scort. (*Eugenia skiophila* Duthie) has rather larger stiffer leaves with very numerous close-set parallel inconspicuous nerves.

1226. **Hederopsis major** *Ridl.* [Araliaceae]; affinis *H. Maingayi* C. B. Cl., foliolis crassioribus oblongo-ovatis, panicula majore, floribus multo majoribus, petalis triangulari-lanceolatis differt.

Arbor glabra, *foliis* subcoriaceis trifoliolatis, foliolis oblongo-ovatis obtuse acuminatis basibus obscure inaequilateris, nervis 4-paribus, 5·5–10 cm. longis 2–5 cm. latis petiolulis lateralibus 5 mm., terminali 2 cm. longis, petiolis 5–10 cm. longis, *paniculis* terminalibus patentibus 20 cm. longis, ramis dissitis 5 cm. longis, umbellis 8 floris pedicellis 8 mm. longis furfuraceis, *floribus* 9 mm. latis pedicellis articulatis, *sepalis* brevibus acuminatis, *petalis* 5 valvatis crassis triangulari-lanceolatis acutis, *staminibus* 5 filamentis gracilibus, antheris subglobosis dorsifixis, *stylo* breviter conico apice 2–3 dentato, *ovario* 5-loculari, obconico obscure costato, fructibus non-visis.

Malay Peninsula. Kelantan, Kwala Aring, Sept. 14, 1899, *R. H. Yapp* 205.

The genus *Hederopsis* is based on a single species once collected by Maingay and never re-collected, which differs from this species in the larger, thinner, lanceolate dentate leaflets, smaller panicle and much smaller flowers, broader sepals and more elongate style.

1227. **Casselia rosularis** *Sandwith* [Verbenaceae-Verbeneae]; habitu nano rosulari ab omnibus speciebus differt.

Herba parva, radice inferne insigniter tuberosa, caule subterraneo supra tubere ad 2 cm. longo pilosulo, floribus foliisque in rosula terrae adpressa 3–6 cm. diametro dispositis. *Folia* exteriora plerumque 4, orbicularia, late oblonga, vel late obovata, apice rotundata obtusissima, basi attenuata vel rotundata, vulgo 1·5–2·5 cm. longa, 1–2·5 cm. lata, interiora minora, omnia supra nigricantia glabra scabriuscula profunde rugosa, subtus purpurascentia rugosa nervis fortiter exstantibus pubescentibus ceterum glabra, margine praesertim dimidio superiore leviter satis inconspicue crenato-dentata; petiolus brevis, pilosulus, ad 4 mm. longus vel subnullus. *Flores* complures in racemis axillaribus, siccitate pseudoterminalibus, dispositi; pedunculi, pedicelli breves 1–1·5 mm. longi, calycesque in angulis atque dentibus pilis brevibus albis setaceis induti; bracteae setaceae ad 1·5 mm. longae. *Calyx* tubo 4–5 mm. longo, fructifero ampliato, angulis crassis pilosulis exceptis glabrescente, sed passim minutissime pubescente, dentibus triangularibus inaequalibus 0·6–1·6 mm. longis. *Corolla* tubo inferne angusto glabro superne ampliato utrinque pubescente ad 7 mm. longo; limbus ad 1 cm. diametro, lobis late rotundatis 2–3 mm. longis ad 5 mm. latis, utrinque pubescentibus. *Stamina* postica 3·5 mm., antica 2·8 mm. supra fundo tubi inserta, filamentis brevibus pubescentibus. *Ovarium* glabrum, ellipsoideum, circiter 1 mm. altum atque 0·7 mm. diametro; stylus glaber, cum stigmate obliquo 1·5–1·8 mm. longus. *Fructus* (immaturus tantum) carnosus rugulosus flavo-olivaceus, fere 3 mm. altus, 2·5 mm. diametro, stylo persistente.

Brazil. Matto Grosso : Burity, on the Chapada plateau N.E. of Cuyabá, 2250 ft., in firm sand in grass in scrub country, September 1927, *C. L. Collenette* 185. "Forms a rosette on the surface of the ground. Flowers mauve."

1228. **Santalum papuanum** *Summerhayes* [Santalaceae] ; affinis *S. lanceolato* R. Br. a quo foliis subchartaceis discoloribus, floribus minoribus, perianthii lobis subacutis, stylo fere exserto differt.

Arbor gracilis, multiramosa ; caulis cortice rugoso brunneo obtectus ; ramuli teretes, grisei, longitudinaliter striati. *Folia* petiolata, late elliptico-lanceolata, apice subacuta, basi cuneata, 5–8 cm. longa, 2–2·75 cm. lata, marginibus leviter revolutis integris leviter undulatis, utrinque glabra, costa supra prominula subtus prominente, nervis lateralibus utrinsecus 9–14 prope marginem arcuatim conjunctus supra prominulis, nervis secondariis reticulum distinctum formantibus ; petiolus gracilis, 7–10 mm. longus, supra leviter complanatus, canaliculatus. *Paniculae* in axillis foliorum superiorum, breves, 1·5–2·5 mm. longae ; bracteae minutae, cito deciduae. *Flores* 4–4·5 mm. longi ; perianthii tubus campanulatus, 2 mm. longus, glaber ; lobi 4, ovati, subacuti vel fere apiculati, 2–2·5 mm. longi, 1·5 mm. lati ; filamenta 1·5 mm. longa ; antherae 1 mm. longae ; disci lobi oblongi, 1 mm. longi ; stylus fere exsertus, stigmate trilobo coronatus. *Fructus* non visus.

Papua. Rigo, a coast timber, cut for export, Dec. 1925, *J. L. Brass* 819.

1229. **Cephalostemon microglochin** *Sandwith* [Rapateaceae] ; a ceteris speciebus capitulis paucifloris, bracteis caerulescentibus omnibus brevissime mucronulatis vel aristatis, floribus parvis differt ; quoad bracteas extimas *C. gracili* Rob. Schomb. similis.

Habitus generis. *Folia* flavo-viridia subrigida sed siccitate arcuato-curvata, basi ad 8 cm. late vaginata, usque ad 45 cm. longa, obtusa, angusta, versus apicem vaginamque angustata, medio 2·5–4 mm. lata, nervis 6–8 atque costa subtus valde prominentibus. *Pedunculi* 5-costato-angulati, ad 50 cm. longi, diametro 1 mm. haud multo excedentes. *Spatha* bivalvis, valvis flavo-viridibus basi late auriculatis 2–3 cm. longis, horizontalibus vel adscendentibus. *Capitula* ad 1·5 cm. alta, ad 2 cm. diametro ; flores 3 sessiles ; bracteae imbricatae, parte superiore haud operta caerulescenti-viridi, striatae, marginibus hyalinis, extimae concavae spathulatae 5 mm. longae ad 2·2 mm. latae brevissime mucronulatae, intimae lanceolatae 7–8 mm. longae ad 2 mm. latae in aristam brevissimam 0·5–1·5 mm. longam attenuatae. *Sepala* 3 straminea, basi connata, concava, ovato-lanceolata, 6–7 mm. longa, basi applanata ad 4 mm. lata. *Petala* membranacea, tenerrima, 7 mm. longa, lobis rotundatis 6 mm. latis. *Stamina* 6 brunnea, filamentis 1 mm. longis, antheris 3 mm. longis, igitur petalis sepalisque facile breviora. *Ovarium* album, trigonum, circiter 1·2 mm. altum atque diametro ; stylus 3·5 mm. longus.

Brazil. Matto Grosso : near the source of the Rio Paraguay (Rio Amolar), Diamantino, in moist boggy soil on the edge of fringing forest, May 23rd, 1927, *Miss Gwen Dorrien Smith* 151. " Flowers pale yellow."

1230. **Pothos armatus** *C. E. C. Fischer* [Araceae] ; proximus *P. remotifloro* Hook., differt ramulis spinulosis, petiolis brevibus et sine alis, spathis brevioribus, inflorescentiis puberulis, florum glomerulis dispersis.

Frutex scandens, omnibus partis glaberrima praeter spadices ; rami ramulique graciles, parum angulati vel striati, pallide brunnei, internodiis distinctis, ramorum 1·5–3·5 cm. longis ramulorum 2–10 mm. longis, nodis parum incrassatis, ob radiculas spiniformes solitarias vel complures, 1–2·5 mm. longas armatis. *Folia* lineari- vel elliptico-lanceolata, parum inequilateralia, acuta vel acuminata vel caudata, basin versus angustata, 8–14 cm. longa, 2–3·6 cm. lata, nervis supra distinctis, costa et nervis lateralibus primariis infra prominentibus, nervis rectis ita e costa divaricatis ut angulum dimidium anguli recti subaequantem exhibeant, marginibus aliquantum revolutis, nervo crasso margine parallelo ; petioli 7–12 mm. longi, supra parum canaliculati, basi semiamplexicaules, saepe torti. *Pedunculi* teretes, graciles, 3–7·5 cm. longi, plerumque arcuati, fusco-brunnei siccitate, 1–2-ni, in ramulis brevibus extra-axillaribus ; bracteae, pedunculos amplectentes 4–6 fusco-brunneae, inferiores suborbiculari-ovatae minutae superiores lineari-oblongae obtusae, 1·5 cm. longae. *Spathae* anguste cymbiformes obtusae vel acutae, 1·4–2 cm. longae, fusco-brunneae. *Spadix* gracilis, teres, vel recta vel anfractuosa, pilis furfuraceis fuscis puberula, 3·75–5·75 cm. longa ; stipes 0·5–0·8 cm. longus saepe glaber. *Flores* pilis furfuraceis fuscis puberuli, minuti, glomerati, glomerulis spiraliter positis ad angulas spadicis millimetro interposito. *Segmenta perianthii* suborbicularia. *Stamina* perianthio longiora ; antherae minutae, albae. *Ovarium* oblongo-truncatum. *Bacca* oblonga, 5 mm. longa, glabra, nisi in apice truncato fusco-puberulo.

South India. Tambracheri Ghat, Malabar, Jan., *C. A. Barber* 5698 (type, in Herb. Kew.) ; Ghat from Ponmudi to Kullar, Travancore, Dec., *C. A. Barber* 7431.

XXIV.—HYBRID CACAO. F. N. Howes.

In recent years several workers in cacao-growing countries have produced evidence indicating the undoubted hybrid nature of cultivated cacao. In two interesting articles by M. Pittier (" Revue de Botanique Appliquée," Dec. 1925 and June 1926), who has made a study of cacao in Venezuela for many years, an account is given of the different cultivated forms of cacao in Venezuela and of the other wild or indigenous species of *Theobroma* in that country. M. Pittier regards all forms of cultivated cacao as belonging to, or

constituting intermediate or hybrid forms between, two fundamental species, *Theobroma Cacao* L. and *T. leiocarpa* Bern. These two fundamental species are regarded as constituting the two extremes of a very wide range, most cultivated forms falling in an intermediate position rather than corresponding with the two extremes. To *T. Cacao* L. would belong the more typical " criollo " cacao of commerce, the pod being rather elongated, clavate, with a rough surface and ten longitudinal furrows, five deep alternating with five shallow. The seeds are plump with pale cotyledons. *T. leiocarpa* Bern., on the other hand, embraces the type characterised among other things by a large, oval, smooth pod with five slightly evident furrows, and flat seeds with dark cotyledons. In Ceylon, the East Indies, and other eastern countries, the cacao grown approaches for the most part *T. Cacao* L., whereas in San Thomé and the large areas under cultivation in West Africa, the forms approach more closely *T. leiocarpa* Bern., the extreme form even appearing in some instances.

The fact that natural crossing takes place readily in cacao, to an extent of about 30 per cent. in Trinidad, has been proved beyond doubt (Genetica, ix, 1927, pp. 280-8). The presence of pollen on the stigmas of flowers of the so-called " male " cacao trees, these flowers producing no pollen themselves, is in itself an indication of the presence of cross-pollination under normal conditions. Attention has frequently been drawn to the existence in cacao plantations of individual trees, the pods of which contain some seeds with pale cotyledons (" criollo ") and some with dark purple cotyledons (" forastero ").

Numerous instances of the wide degree of segregation that takes place on raising trees from seed from a single mother tree are on record—in some instances the seed being from a single pod. This may be due to a heterozygous make-up in cultivated cacao or to cross-pollination, or to both these factors. It seems evident that both factors are responsible, their respective influences varying with different conditions and in different strains or types of cacao. An interesting example is afforded from planting experiments carried out by the late Mr. H. L. Van Buuren at Peradeniya, Ceylon, in 1908 (*see* " The Tropical Agriculturist," Dec. 1928). Five acres were planted from seed of a single high-yielding tree of the " cundeamur " type. When the trees came into bearing a careful study was made of the whole plot and great variation in the size, shape, colour and general nature of the pods was found to exist. Pods of surprising and unexpected forms were met with and it is stated that in this five-acre plot fruits could be selected " showing characters comparable with that of any well-known ' variety ' found in the cacao-growing countries of the world." As there is no information to the contrary it is assumed that with the parent tree of this plot no measures were taken to ensure self-pollination. There is also nothing said as to the situation of the parent tree, whether in close proximity to trees of other varieties of cacao or not.

In Trinidad work of a systematic nature on budding of cacao was commenced in 1914, when experiments at the River Estate were arranged by the Department of Agriculture to test to what extent the heavy yielding character of parent trees was transmitted to their offspring in the form of seedlings, grafted and budded plants. In discussing the results of these experiments that have so far been obtained Harland states (*see* " The Yield of Budded and Seeded Cacao," in Proceedings of the Agric. Soc. of Trinidad and Tobago xxviii, Pt. vi, June 1928) " A heavy bearing tree may transmit heavy yield to its budded offspring. On the other hand it may absolutely fail to transmit and may give rise to trees which are much worse than the average. There is no method of telling whether a tree will transmit heavy yield either to its budded or seedling offspring except by testing it."

The fact that cacao cannot, at the present time, be reliably propagated true to type, particularly where yield is concerned, either from budded or seedling trees, illustrates all the more forcibly the urgent need for fundamental cacao research in order that our knowledge and understanding of this important crop should not lag behind in the march of progress that is now being made with many other tropical crops.

Reasons why Trinidad, with the Imperial College of Tropical Agriculture as the centre, should be chosen for cacao research of this nature are clearly outlined by Prof. E. E. Cheesman (Professor of Botany at the College), in a memorandum on " Biological Researches on Cacao " submitted to the Advisory Committee of the College in 1928. Prof. Cheesman draws attention to the great range of variation in the yield of individual trees in the average cacao plantation, where the number of pods produced per tree per annum may vary from less than 10 to over 200. Individual trees he regards as *genetically* heavy, medium or poor bearers, for it has been shown that alterations in treatment do not fundamentally affect these differences in yield.

In view of the length of time that must elapse before one can hope to obtain strains of cacao that will " breed true," Prof. Cheesman lays great emphasis on the urgent need of a thorough investigation into the question of the vegetative propagation of this crop, as the inter-relationship of stock and scion in the case of cacao is at present quite unknown.

Another problem regarded as of first importance is " to determine the factors influencing flavour and whether they are hereditary or environmental." With regard to pruning the author states " A fourth line of investigation, also physiological, concerns pruning—the precise effects of different treatments upon the tree and determination of the best methods. Pruning again is only one method of modifying nutrition, and the other common method, manuring, also stands in urgent need of precise research." At the end of the

memorandum a scheme is suggested for inaugurating the preliminary work, which it is considered could be performed by a geneticist and a physiologist working in close co-operation.

XXV.—THE IRIDACEAE OF BURMANN'S FLORAE CAPENSIS PRODROMUS. N. E. Brown.

Through the courtesy of Dr. John Briquet, Director of the Botanic Gardens, Geneva, I have had the opportunity of comparing the types of the South African Iridaceae described by N. L. Burmann in 1768 in his Florae Capensis Prodromus with specimens in the Kew Herbarium. The present paper embodies the result of my comparisons, which, as will be noted, involve several alterations of nomenclature.

The collection is an interesting one : the specimens are mostly very good and well preserved. Many of them are from cultivated plants, and some, I find, are the actual specimens from which the figures in Houttuyn, Handleiding Plant- en Kruidkunde, vol. xii, were drawn. These figures, on account of their worthless colouration, have by many been considered to be poor or bad figures ; but so far as these specimens show, in outline and size they are exceedingly accurate, so that a photograph would scarcely give the outline more exactly. The names, however, under which they are figured, require to be investigated before accepting them as authentic. Several of the specimens in Burmann's Herbarium I have failed to match with any at Kew, and they are probably undescribed species. Unfortunately not one of them is localised.

Beside the plants of Burmann, the Geneva herbarium contains specimens from many other of the older botanists and collectors, and, as it is sometimes useful to know where the plants of certain collectors may be found, I give below a list of collectors I have noted as being represented among the South African Iridaceae in the Geneva herbarium :—

Belanger, Bergius, Bowie, Chelsea (Hort.), Commerson, Dalhousie (Lady), Drège 1839-1841, Ecklon and Ecklon & Zeyher (1845), Elliot (Miss Eliza) 1838, Elliot (" Miss and Mistress "), Forster, G., Goudot, Graham (Herb.) received in 1846, Leibold 1838, MacWilliam, Masson, Niven, Palisot de Beauvois, Perrottet (Jardin des Plantes 1822-1823), Puerari (Herb.) 1824, Roth, Roxburgh, Salisbury (several of his types), Sieber 1825, Thunberg, Ventenat (Herb.), Verreaux 1827-1828, Wallich, Zeyher.

In Burmann's herbarium are numerous duplicate sheets from Thunberg's herbarium, evidently given to Burmann before Thunberg had published his descriptions, because several of them bear names that do not occur in Thunberg's own herbarium. For example, there are two sheets of *Ferraria undulata* Linn., duplicates from Thunberg's herbarium, both labelled in Thunberg's own handwriting " *Moraea fastuosa* Thunb.", and one of them also bears the name

"*Moraea crispa* Thunb.", but "*crispa*" has been crossed out and "*fastuosa*" substituted. In Thunberg's herbarium the corresponding specimen is named "*Moraea undulata.*" The sheet of *Galaxia ovata* Thunb. in Burmann's herbarium is labelled by Thunberg "*Ixia monadelpha* Thunb." ! These two examples suffice to show that Thunberg originally gave other names to some of his species, but that, Linné having altered them, he adopted the names that Linné published or changed them himself.

The collection of Jules Verreaux is probably a complete one, as it contains his original labels, and, as it has not hitherto been known where he collected, I have noted the following localities from his labels :—Table Mountain, 1827-1828 ; Lion Mountain, June and Sept., 1827 ; Constantia, Sept., 1827 ; Slang Kop, Sept., 1827 ; Mosterts Bay, no date ; Hottentots Holland, Sept. and Oct., 1827 ; Caledon, Oct. and Dec., 1827 ; Genadendal, Feb., March, Sept. and Oct., 1827 ; Swellendam, Sept. and Nov., 1827 ; George, Aug., 1827 ; Montagu and Uitenhage, no date.

Upon a sheet containing a species of *Babiana* from Roxburgh's herbarium, is written in the handwriting of Salisbury, who was a very clever cultivator of bulbous plants, "At Chapel [Allerton] collection for 10 years, but it never flowered, and I have no doubt owing to pulling of the old coverings off the root every year." This is undoubtedly a very wise remark that is worthy of the attention of cultivators.

One point that this herbarium strongly demonstrates, is the truth of the view that the concept of a species as adopted by Burmann and many of the old botanists, was of such a broad character that even plants belonging to what are now recognised as different genera were included in it and therefore appear under the same specific name.

In the following list the genera and species enumerated by Burmann are arranged alphabetically.

Antholyza *Linn.*

A. aethiopica Burm. Two sheets=**A. praealta** *Red.*, which differs from the type of *A. aethiopica* Linn. in the Linnean Herbarium by its much broader leaves and by the upper part of the tube of the flower being rounded into the slender part, while in the true *A. aethiopica* it is truncate there.

A. alethroides Burm.=**Watsonia aletroides** *Ker.* Burmann, by some error, has misspelt the generic name *Aletris* from which he derived his specific name, therefore Ker's more correct spelling of the name should be maintained.

A. caryophyllacea Burm. I do not match this species at Kew. It is a true *Antholyza*, with entire (not bifid) style-arms, and it is not at all like *Watsonia humilis* Mill., to which Baker has referred it as a synonym. Burmann's specimen is evidently the type of the figure in Houttuyn, Handleid. xii, 63, t. 79, f. 3, as that excellent figure exactly represents Burmann's specimen in every detail.

A. cunonia Burm.=**A. cunonia** *Linn.*

A. Meriana Burm. One sheet so named=**Watsonia Meriana** *Mill.* Two sheets=**Watsonia brevifolia** *Ker* and three sheets=**Watsonia humilis** *Mill.*

A. quadrangularis Burm. This is probably the same as a specimen at Kew labelled as having been "obtained from the Ceres exhibit, Cape Town Flower-show, Oct. 1917," but the Kew specimen is without leaves. Burmann's type is not in the least like the plant that appears to be considered by South African botanists as being *A. quadrangularis*, and is perfectly distinct from the plant described as *A. quadrangularis* by Baker in Fl. Cap. ii, 166. The latter is founded upon the plant originally figured as *Gladiolus abbreviatus* Andrews, Bot. Rep. t. 166, and must therefore take the name of **Antholyza abbreviata** *Pers.*

A. revoluta Burm. No specimen; but according to the description it is now almost certain that it cannot be the plant that Baker and South African botanists call *A. revoluta*. See also under *Gladiolus angustus* Burm.

A. ringens Burm.=**Babiana ringens** *Ker.* One sheet so named is however **Babiana Thunbergii** *Ker.*

Crocus *Linn.*

"*C. capensis* Burm. a?" A specimen so named, which is probably that to which Burmann refers as having "floribus violaceis," is typical **Romulea rosea** *Eckl.* This is the only specimen named *C. capensis* in the collection.

C. sativus B. Herb. Burm. is probably intended for *C. sativus latifolius* Burm. The specimen consists of the flowers of a *Crocus* and the leaves of some other plant, possibly a *Colchicum.*

C. triflorus Burm. This is *Romulea sublutea* Baker, which he identifies with *Ixia sublutea* Lam. (1789), but as Burmann's name is older (1768), and I also doubt the correctness of Baker's identification, I propose to change the name to **Romulea triflora** *N. E. Br.*

Gladiolus *Linn.*

G. alatus Burm. is partly **G. alatus** *Linn.* and partly an allied species not matched at Kew. Another specimen so named is a species of *Ixia.*

G. alopecuroides Burm.=**Micranthus alopecuroides** *Eckl.*

G. angustus Burm. This is not *G. angustus* Linn., but is the plant which Baker and South African botanists call *Antholyza revoluta* and which=*Gladiolus Watsonius* Thunb., but it is now evident that it cannot be the true *Antholyza revoluta* Burm. Another sheet marked as being "*G. angustus*" is **Sparaxis fimbriata** *Ker.*

G. capitatus Linn. No specimen, and is probably merely quoted from Linné.

G. carneus Burm.=**G. carneus** *La Roche* as understood by Baker.

G. communis Burm., not of Linné. One specimen so named is **G. villosus** *Ker*; another is a fine species that I do not match at Kew, but as it is leafless it cannot be described. Other specimens belong to **Watsonia rosea** *Ker.*

G. corymbosus Burm. This name is omitted by Baker from all his works on Iridaceae, but the plant proves to be the well known *Freesia refracta* Klatt, which must now take the name **Freesia corymbosa** *N. E. Br.*

G. galeatus Burm.=**G. alatus** *Linn.*, which was published eight years earlier.

G. involutus Burm., not of La Roche. One specimen=**G. linearis** *N. E. Br.*(=*Ixia linearis* Linn. f =*Gladiolus biflorus* Klatt); and another specimen is a species of *Gladiolus* I cannot name.

G. junceus Burm. This is the well known **Geissorhiza secunda** *Ker*, founded upon *Ixia secunda* La Roche, a name two years older than that of Burmann.

G. laceratus Burm. No specimen.

G. permeabilis La Roche. No specimen.

G. plicatus Burm. Burmann gives no description, but quotes Miller, Fig. of Pl. t. 155, fig. 1, and Breyne, Ic. Rar. Pl. p. 22, t. 9, f. 2, for the plant. But these two figures represent two different species of *Babiana*, and as the specimens in his herbarium named *G. plicatus* belong to several different species of *Babiana* and to one species of *Gladiolus*, which latter I cannot match at Kew, I suggest that the plant figured in Bot. Mag. t. 576, named by Ker *Babiana plicata*, be taken as the type of the species, especially as it seems to be the same species as that represented by Breyne in the figure and description above quoted, and also by specimens in Burmann's herbarium.

G. pyramidalis Burm. No specimen so named. But there is a specimen from which a name on the bottom of the sheet has evidently been cut off, and which bears on one label with it the name "*Watsonia pyramidata et spicata*," and on another label "*Ixia foliis nervosis fl. pyramidali tubuloso carneo.*" This is possibly the plant Burmann intended by the name "*G. pyramidalis.*" It is a species of **Watsonia** allied to *W. brevifolia* Ker, but I cannot match it at Kew. It agrees very well with the description of *G. pyramidalis* Burm. As I find that some of the names under which Burmann described his plants have been crossed out, and other (sometimes unpublished) names substituted, it is quite possible that if this is the type of *G. pyramidalis* Burm., the name for some reason may have been removed from the sheet.

G. ramosus Burm., not of Linné. Burmann gives no description of this plant, but quotes for it the plant illustrated by Miller, Fig. of Pl. t. 235, f. 2, which is also the type of *Gladiolus recurvus* Linn., published one year earlier (1767), and is not the plant that Baker and South African botanists call *G. recurvus*. The plant in

Burmann's herbarium named *G. ramosus* appears to be a species of **Acidanthera,** which I do not match at Kew.

G. recurvus Herb. Burm. This name is not mentioned in Burmann, Fl. Cap. Prodr., but, as he has labelled the specimen "*Gladiolus recurvus* Linn. Nat. Histr. ii. D. xii. Stuckbl. Pl. lxxix. fig. 1," I looked at that figure in the work also known as Houttuyn, Handleid. Plant- en Kruidkunde xii, 49, t. 79, f. 1, and found that it represents the actual specimen from which Houttuyn's figure was drawn, and apart from the bad colouring it is a faithful representation of the specimen natural size. The plant is a species of *Antholyza* which I do not match at Kew; but it is not *Gladiolus recurvus* Linn., and as that specific name is not applicable to it I propose to call it **Antholyza acuminata** *N. E. Br.* in allusion to the long and narrow acuminate lobes of the flower, syn. *Gladiolus recurvus* Houtt., not of Linné.

G. tristis Burm. This is partly **G. tristis** *Linn.*, partly **G. grandis** Thunb., and partly **G. recurvus** *Linn.*, not of other authors.

G. tubulosus Burm. This plant proves to be the same as *Micranthus fistulosus* Eckl., therefore that species should now be known as **Micranthus tubulosus** *N. E. Br.*

G. villosus Burm. This is the plant known as *Synnotia bicolor* Sweet, but as Burmann's name is older it must now be called **Synnotia villosa** *N. E. Br.* The figure of it which Burmann quotes (Breyne, Ic. Rar. Pl. p. 22, t. 8, f. 2) is a fairly good one, and quite unmistakable.

Iris *Linn.*

I. capensis Burm. This proves to be the well known Spanish species, **I. xiphium** *Linn.*, and is not a South African plant.

Ixia *Linn.*

I. africana Burm.=**Aristea africana** *Hoffmansegg.*

I. arcuata Burm. No specimen.

I. bulbifera Burm. Specimens so named belong partly to **Sparaxis bulbifera** *Ker*, and partly to **S. fimbriata** *Ker.* One specimen named "*I. bulbifera*?" is a species of **Tritonia,** which I do not match at Kew, but which is near *T. lineata* Ker.

I. bulbocoides La Roche. No specimen, the name being probably merely copied into the list from La Roche.

I. campanulata Houtt. The type of Houttuyn's figure and description, published in 1780, is in Burmann's herbarium, and upon the sheet is written in pencil the name "*Ixia crateroides* Ker" in the handwriting of Salisbury, so that from this and other sheets bearing his handwriting it appears that Salisbury saw and examined the specimens in Burmann's herbarium. But as I find *I. campanulata* to be identical with *Ixia speciosa* Andr., which was not published until 1801, the name **I. campanulata** *Houtt.* must supersede *I. speciosa* Andr. The plant which Baker (Fl. Cap. vi. 80) has wrongly

identified with *I. campanulata* Houtt. must be given a new name, and all the references and synonyms quoted by him under *I. campanulata* excluded. I propose for it the name **Ixia dispar** *N. E. Br.*, the type being Cooper 3611, from near Worcester, which is labelled as having "pink" flowers. It is allied to *I. elegans* N. E. Br., but has much broader leaves.

I. caryophyllacea Burm. No specimen so named, but there is one specimen written up "*Ixia caryophyllcea*" which agrees with the description in having whitish or white flowers marked with a yellow spot on one (or more?) of the lower segments, and is no doubt the plant Burmann intended by the name *I. caryophyllacea*. This plant is the same as *Freesia xanthospila* Klatt, so that the latter name should give place to **Freesia caryophyllacea** *N. E. Br.* With the flowers are mounted two leaves of some *Babiana*.

In the Geneva herbarium are also several specimens named "*Ixia caryophyllacea*," but these have blue flowers, and belong to **Lapeyrousia azurea** *Eckl.* and **L. corymbosa** *Ker.*

I. corymbosa Burm. Several specimens so named. Two of them =**Lapeyrousia corymbosa** *Ker*, one of which is the very specimen from which the figure of *I. corymbosa* in Houttuyn, Handleid. xii, 18, t. 77, fig. 1 was made. Other specimens are identical with a species of *Babiana* which equals MacOwan, Herb. Austr. Afr. 584 and 586; one with a species of *Babiana* I do not match at Kew, and one is **Sparaxis grandiflora** *Ker.*

I. crocata Burm. Partly=**Tritonia crocata** *Ker*, according to Baker, but I suspect that when dried this species is confused with *T. miniata* Ker. And partly=**Tritonia deusta** *Ker.*

I. Fabricii Burm. Herb., not of La Roche. One specimen is **Geissorhiza secunda** *Ker*, and another is **Geissorhiza excisa** *Ker.*

I. flabellifolia La Roche. There are four sheets of specimens bearing this name in Burmann's herbarium. Three of them belong to species of *Babiana* that I do not match at Kew, and which do not agree with the description of La Roche, inasmuch as none of them has more than one branch to the stem, the flowers are always distichous, never secund, the tube of the flower is not or scarcely twice as long as the bracts and the style is far exserted from the tube of the flower and much longer than the stamens. Therefore none of these specimens can be the type of *I. flabellifolia.*

The fourth specimen, however, seems to exactly agree with La Roche's description, for it has seven basal leaves arranged in fan-like manner, two stem leaves, one under each of the two branches, the flowers when in bud are distichous and those expanded are secund, and the tube of the flower is twice as long as the bracts. The only discrepancy is that the style is exserted from the tube and as long as the stamens. The name "*I. flabellifolia*" is in a different handwriting from that on the other sheets, and I believe it to be the writing of La Roche, but the name has been crossed out by Burmann and

the unpublished name "*axillaris*" substituted, which is also written on two of the sheets of *Babiana* above mentioned. Yet, as the specimen so accurately agrees with the description of *Ixia flabellifolia* in all characters except the length of the style, I think there can be no doubt that it is the type of that species. This plant is the same as *Acidanthera capensis* Benth. and should now take the name of **Acidanthera flabellifolia** *N. E. Br.*

I. flexuosa Burm. There are eight sheets so named in Burmann's herbarium containing specimens of *Ixia patens* Ait., *I. candida* Eckl.; *I. nigroalbida* Klatt; *I. campanulata* Houtt.=*I. speciosa* Andr.; *I. maculata* Linn.; *Sparaxis bulbifer* Ker and *Tritonia* sp. As he does not give a description, and the figure he quotes for the plant in Miller, Figures of Plants t. 156, f. 2, had previously been named *I. Milleri* by Berg, it appears that the name *I. flexuosa* cannot in any way be maintained.

I. grandiflora La Roche=**Sparaxis grandiflora** *Ker.* One of the specimens is the type of the figure in Houttuyn, Handleid. xii, t. 77, f. 3. One specimen named *I. grandiflora* is a species of *Babiana*.

I. imbricata La Roche. One specimen = **Geissorhiza imbricata** *Ker*, and may be the true *I. imbricata* La Roche, but the flower-stem is not branched as he describes. Another specimen is a *Babiana* that together with several other distinct species is placed by Baker under *B. stricta* Ker, but is not that species. Another specimen is a very distinct species of *Babiana* which I do not match at Kew. And a fourth specimen=MacOwan, Herb. Austr. Afr. 584 and 586, wrongly named *B. stricta* var. *rubrocyanea* by Baker.

I. latifolia La Roche. This is the type specimen of La Roche. I do not match it at Kew, but the plant is a very distinct species of *Tritonia*=**Tritonia latifolia** *N. E. Br.* (*Geissorhiza latifolia* Baker).

I. maculata Burm. is partly **I. maculata** *Linn.*, partly **I. erecta** *Thunb.*, and partly a species of **Tritonia** near *T. lineata* Ker, but not that species, the lobes of the flower being more pointed and less conspicuously veined; and as *T. lineata* is an eastern species and the eastern part of the country was quite unexplored in Burmann's time, he would not be likely to have any plants from that part.

I. monadelpha La Roche. The type specimen of the species, which is correctly understood.

I. monanthos La Roche. The type specimen of the species, labelled, in the handwriting of La Roche, I believe, "*Ixia monanthos* L. R. flava maculata. Floruit 1759." It is a species of *Sparaxis* not represented at Kew, but allied to *S. lineata* Sweet and *S. tricolor* Ker, differing in its bracts and colour of the flowers, and most certainly distinct from *S. grandiflora* Ker, to which Baker has referred it. The following is a description of it.

Sparaxis monanthos *N. E. Br.* *Leaves* erect, 9–12 cm. long, 6–9 mm. broad, broadly linear, slightly hooked-incurved at the tips.

Peduncle 16 cm. long, 1-flowered, probably a weak plant. *Bracts* 15 mm. long, including the bristles into which they are divided for half their length, pallid, with brown edges and bristles. *Perianth-tube* about 7 mm. long; lobes about 2·5 cm. long and 8 mm. broad, linear-oblong, obtuse, yellow with a large blackish spot above the base. Style exceeding the anthers; stigmas 7 mm. long.

I. ovata Burm. No specimen.

I. paniculata La Roche. The specimen so named by Burmann is not *I. paniculata* La Roche, but an entirely different species, with very different bracts, and flowers which have a much shorter tube. I do not match it at Kew, and the specimen is leafless.

I. pigmaea Burm. This plant is *Babiana macrantha* MacOwan, which must now take the name **B. pygmaea** *N. E. Br.* Burmann has described the leaves as glabrous, but this is not the case, they are pubescent. The plant Baker has mistaken for *I. pigmaea* Burm. and described as *Babiana pygmaea* is *Babiana nana* Spreng.

I. polystachya Burm=**I. polystachya** *Linn.*, and the form mentioned as having violaceous flowers is **I. columellaris** *Ker.*

"*I. quadrangularis*? La Roche, Dissert. no 2."=**Geissorhiza secunda** *Ker.* If this is the plant Burmann intended by his published name "*I. quadrangularis* La Roche" it cannot be that species.

I. scillaris Burm. and of Linn.=**Tritonia scillaris** *Baker*, but one specimen=**Geissorhiza setifolia** *Eckl.*

I. secunda Burm., not of La Roche. One specimen so named =**Babiana** sp. and is the same as *Gladiolus* sp. sheet i of Herb. Thunberg. Another is **Babiana plicata** *Ker*, as in Bot. Mag. t. 576. Other specimens are unidentified species of *Babiana* and one is **Geissorhiza rochensis** var. **spithamea** *Ker ex Baker.*

I. spicata Burm. This proves to be *Hesperantha cinnamomea* Ker. But as Burmann's name was published in 1768, while *Ixia cinnamomea* Linn. f. was not published until 1781, the name must be changed to **Hesperantha spicata** *N. E. Br.*

I. thyrsiflora La Roche and of Burm. This name Baker has wrongly referred to *Ixia flexuosa* Linn., but the plant is an *Aristea*, and must take the name **Aristea thyrsiflora** *N. E. Br.*=*A. major* Andr. (1801)=*A. capitata* Ker (1802), as La Roche's name is much older than those of Andrews and Ker.

I. triticea Burm.=**Antholyza triticea** *N. E. Br.*=*A. lucidor* Linn. f. *Ixia triticea* Burm. has been mistaken by authors for *Micranthus plantagineus* Eckl., but it is identical with the plant described by the younger Linné as *Antholyza lucidor*. I therefore restore its older name.

Another and very similar species has been confused with *A. triticea*, in habit and foliage it is the same, but its flowers have a tube about 30 mm. long and segments 16–20 mm. long, whereas in *A. triticea* the tube is only 20–25 mm. and the segments 10–12 mm. long. This larger-flowered plant I propose to call **Antholyza**

Burchellii *N. E. Br.* It was collected in Caledon Division; between Donker Hoek and Houw Hoek Mountains, *Burchell* 8013 (the type), and Donker Hoek Mountains, *Burchell* 7962.

I. tubulosa Burm. There are four specimens so named, two of them=**Babiana tubulosa** *Ker* and must be regarded as the types of that species. They belong to the form that Burmann describes as having broader leaves contracted into a petiole as long as the blade. The other two specimens belong to the genus *Acidanthera* and, having linear leaves and apparently whitish flowers, correspond to the form Burmann describes as having rush-like leaves and whitish flowers. One of these two is a luxuriant cultivated specimen of **Acidanthera flabellifolia** *N. E. Br.* (*Ixia flabellifolia* La Roche). The other is the type of *Ixia tubulosa* Houttuyn, Handleid. xii, t. 78, f. 2, which is so exact a representation, natural size, of Burmann's specimen that a photograph would scarcely give the outline more correctly. I do not find any specimen at Kew like it. But Baker, who I know held the opinion that Houttuyn's figures were very poor drawings, mistook Houttuyn's figure for a bad representation of *A. exscapa* Baker, and, having made this misidentification without having seen Houttuyn's type, changed the name of *A. exscapa* to *A. tubulosa*. I therefore propose that Houttuyn's type in Burmann's herbarium should take the name **Acidanthera tubulosa** *N. E. Br.* and that *A. tubulosa* Baker be quoted as a synonym of **A. exscapa** *Baker*.

I. umbellata Burm. No specimen.

I. undulata Burm. This plant is a *Tritonia* and has been completely misunderstood by Ker and by Baker, who have wrongly supposed it to be the same as *Ixia crispa* Linn. f. I fail to match the type of *Ixia undulata* Burm. Fl. Cap. Prod. p. 1* with any specimen at Kew, and therefore give the following more complete description of it.

Tritonia undulata *N. E. Br.* The specimen is 12 cm. high, with three basal leaves 6–7·5 cm. long and about 6 mm. broad at the base, thence gradually tapering to a fine awn-like point, and the whole leaf crisped at the edges and undulated and twisted. *Stem* slender, with two reduced leaves 14–16 mm. long below its middle, and a lax spike of three developed flowers and three aborted buds. *Bracts* 4–5 mm. long, the outer ovate, obtuse, veinless, brown. *Perianth* with a slender tube 10–12 mm. long and oblong lanceolate obtuse lobes about 10 mm. long and 3 mm. broad.

This species is nearly allied to *T. crispa* Ker but is smaller and the flowers are not half as long.

As *Ixia crispa* Linn. f. has hitherto been mistaken for *I. undulata* Burm. but is a different species, and as the specific name "*crispa*" has already been used in the genus *Tritonia* I propose to change the name and call it **Tritonia Thunbergii** *N. E. Br.* (syn. *T. undulata* Baker, *Ixia crispa* Linn. f.).

M. juncea Burm. No specimen.
M. vegeta Burm.=**M. juncea** *Linn.*

Phalangium *Burm.*

P. obsoletum Burm. No specimen. Burmann quotes for this plant the figure in Plukenet, Phytog. t. 187, f. 3, which is probably intended for some species of *Anthericum*. But Burmann also quotes this same figure under *P. ramosum* together with that in Miller, Figures of Pl. t. 56, which also represents a species of *Anthericum*.

P. ramosum Burm. According to the type specimen and the description this plant is *Melasphaerula graminea* Ker, but as Burmann's name is older than *Gladiolus gramineus* Linn. f. upon which Ker's name was founded, and the plant is probably the same as that intended by the name *Gladiolus ramosus* Linn. (1762), the name should be changed to **Melasphaerula ramosa** *N. E. Br.* The figure in Miller, Figures of Plants t. 56, quoted by Burmann for this species, is not an Iridaceous plant, but a species of *Anthericum*.

It may be well to point out here that the name *Melasphaerula* is wrongly spelt *Melasphoerula* in Flora Capensis, vi, 115.

P. spicatum Burm. Here, again, the figure in Plukenet, Almagestum, t. 310, f. 1, quoted by Burmann as representing this species, does not accord with his type specimen, which is identical with the plant Baker has named *Micranthus plantagineus* var. *juncea*. The figure of *Phalangium spicatum* in Houttuyn, Handleid. xii, 115, t. 80, f. 2, was, as mentioned in other cases, undoubtedly drawn from Burmann's type specimen and correctly represents it. As this plant is quite distinct from *M. plantagineus* Eckl., and as the name *M. spicatus* has already been used for another plant, I propose to call it **Micranthus junceus** *N. E. Br.*

Vieusseuxia *La Roche.*

V. aristata Burm. not of La Roche. The herbarium contains three sheets so named. The principal one, and probably that intended to bear the name=**Morea villosa** *Ker*, and from this specimen the figure in Houttuyn, Handleid. xii, t. 80, f. 1, named *V. aristata* was evidently drawn; but this specimen is certainly *M. villosa*, and has pubescent leaves and purplish flowers.

Another sheet contains a species of **Hexaglottis** and the third sheet contains a flowerless specimen of a **Morea** I do not match at Kew.

V. fugax Burm., not of La Roche. There are two sheets bearing this name, and one of them also bears it in the handwriting of A. P. De Candolle, but also on the sheet the specimen is stated to have "floribus flavis" and is certainly not the true *V. fugax* La Roche, but identical with *V. spiralis* La Roche and *V. Bellendeni* Sweet, figured in Bot. Mag. t. 772 as *Morea tricuspis* var. *lutea* Ker. As the

specific name "*spiralis*" has already been used under the genus *Morea*, and as this plant is quite distinct from *M. tricuspis*, I propose to name it **Morea Bellendeni** *N. E. Br.*

Another sheet named *V. fugax* contains an unnamed species of **Hexaglottis.**

V. spiralis La Roche. No specimen.

In the Geneva herbarium is a specimen named by A. P. De Candolle "*Vieusseuxia pavonia* Decand.", and is doubtless one of the plants included in his account of this species in Ann. Mus. Nat. Hist. ii, 139, but the specimen appears to me to belong to **Morea villosa** *Ker*, rather than to *M. pavonia* Ker.

XXVI.—MISCELLANEOUS NOTES.

Mr. G. N. Herrington has been appointed by the Secretary of State for the Colonies, an Agricultural Instructor, in the Education Department, Nigeria.

The following appointments at the Royal Botanic Gardens, Kew, have been made by the Minister of Agriculture and Fisheries :—

Mr. N. Y. Sandwith and Mr. F. Ballard to be Temporary Assistants in the Herbarium.

Mr. C. E. Hubbard and Mr. E. W. B. H. Milne-Redhead to be Temporary Sub-Assistants in the Herbarium.

Retirement of Curator.—The retirement of Mr. William Jackson Bean, I.S.O., on 20th May, under the age limit, has brought to a conclusion a career of long duration in the public service and of great distinction in the horticultural world.

Mr. Bean entered Kew as a Student Gardener on April 2nd, 1883. His ability was speedily recognised and he was advanced to the position of Sub-foreman in charge of the orchid and other tropical collections in October of the same year. In 1888 he was promoted to be Foreman in charge of the Temperate House department. In 1892 he became Foreman in charge of the Arboretum and it was in this department that he built up the unrivalled knowledge of trees and shrubs which has earned for him a world-wide reputation and which has been made available to tree-lovers at large in his well-known book "Trees and Shrubs hardy in the British Isles."

In 1900 the value of Mr. Bean's services was recognised by his position being raised to the rank of Assistant Curator.

On 1st June, 1922, on the retirement of the late Mr. W. Watson, Mr. Bean was appointed Curator, a position in which his sound business ability and administrative capacity have been no less marked than his technical knowledge.

In 1917 the Royal Horticultural Society conferred on Mr. Bean the Victoria Medal of Honour in Horticulture, and in 1924 he received the distinction of being created a member of the Imperial Service Order.

In succession to Mr. Bean, the Minister of Agriculture and Fisheries has appointed as Curator, Mr. Thomas William Taylor, Assistant Curator in charge of the Tropical Department.

Richard Henry Yapp, who died on January 22nd, 1929, after a long illness, was born at Orleton, Herefordshire, in 1871, and graduated B.A. from St. John's College, Cambridge, in 1898, and M.A. in 1903. He was placed in the first class in both parts of the Natural Science Tripos, and was Frank Smart Student of Botany at Gonville and Caius College, 1899-1902, and Curator of the Cambridge University Herbarium from 1900 to 1903. Together with the late Prof. D. T. Gwynne-Vaughan he accompanied the Cambridge University Scientific Exploring Expedition to the Malay States in 1899-1900, where he made large collections of plants, which he determined at Kew during vacations. In 1904 he was called to the Professorship of Botany at University College, Aberystwyth, where he remained until 1914. From 1914 to 1919 he was Professor at Queen's University, Belfast, and in the latter year succeeded Dr. G. S. West as Mason Professor of Botany in Birmingham University, where he remained until his death.

He went to South Africa with the British Association in 1905, and was elected president of the botanical section for the Glasgow meeting in 1928, but resigned on account of ill health.

His favourite subject was ecology, on which he published an article on the vegetation of Wicken Fen, on *Lecanopteris carnosa* and ants, and other papers in the Journal of Ecology. In 1921 he was President of the Ecological Society. His text-book of Botany was published by the Cambridge University Press. C. H. W.

John Merle Coulter. We regret to learn of the death of Prof. John Merle Coulter at Yonkers, New York, on December 23rd, 1928. Prof. Coulter's early work was mostly in the field of taxonomy and he published various books and papers dealing with the systematics of North American plants. In this country he is chiefly known for his work on the morphology of Angiosperms and Gymnosperms, and his well-known text-books (with C. J. Chamberlain) on these groups are in constant use. The advanced text-book issued in collaboration with C. R. Barnes and H. C. Cowles is often considered the best in the English language. With the assistance of M. C. Coulter he also published the very useful book *Plant Genetics*. As the founder, and for more than half a century the editor, of the *Botanical Gazette* Prof. Coulter attained eminence as a botanical editor. In his own country his greatest single influence was as a teacher, and it is recorded that he was "an inspiring lecturer, a splendid counselor, and a devoted friend." W.B.T.

Ernest Ellman.—The death of the Rev. Ernest Ellman at Bath on January 30th, at the age of 74, removes a picturesque figure

from the narrow circle of British botanists. Although he neither formed a collection nor published, his extraordinary enthusiasm for searching for plants and noting their habitats, associations and disbution, led him to travel extensively over Western Europe and brought him in touch with many systematists both at home and on the Continent. In Britain, he held a succession of curacies in the southern counties, and botanized especially in his native Sussex, in Somerset, Kent and Cornwall, his records adding considerably to the knowledge of their respective floras. Abroad, he had worked the Alps and the Riviera with particular care, and of late years had turned his attention to the wonderfully rich flora of the Iberian Peninsula. Since the war he visited Spain at least six times, at first in company with either M. Jahandiez or Messrs. Cedric Bucknall and J. W. White ; but on the last four occasions he invited one or other of the younger botanists from Kew to accompany him, and the resulting collections were presented to the Herbarium. These, together with others from the Pyrenees and from Switzerland, amount to nearly three thousand gatherings of interesting plants. Mr. Ellman's name is commemorated in a new *Juncus* and a new *Teucrium* which were collected on his Spanish expeditions (*Kew Bull.* 1928, no. 4, pp. 151, 153). N.Y.S.

Plants from Spain.—The last collection made by the Rev. E. Ellman in south-east Spain with Mr. N. Y. Sandwith has now been named and incorporated in the Herbarium.

On this occasion, several particularly interesting and rich localities were worked, notably the remote and rarely visited Cabo de Gata, south-east of Almeria, where several of the remarkable endemics, including the spiny *Antirrhinum Charidemi*, were collected; the Sierra Alhamilla and Barranco del Caballar near Almeria, which abound in species of an African type occurring nowhere else in Spain or in Europe ; Velez-Rubio ; Lorca, for the endemic Crucifer, *Guiraoa arvensis* ; Alicante ; and the famous district of Denia, which provides a number of the rarest and most interesting Spanish species. These Denia plants, described by the old botanists Cavanilles and Webb, remained legends until as recently as 1883 and 1884, when this part of the coast was at last revisited by Rouy and by Mr. C. C. Lacaita. In a week at Denia nearly all the specialities were collected, including the splendid endemic *Carduncellus dianius* Webb, *Convolvulus valentinus* Cav. and *Erucastrum brachycarpum* Rouy, all in their *locus classicus* and hitherto unrepresented at Kew. Other additions to the Herbarium made during this expedition included two very rare and little known species of *Helianthemum*, *H. cinereum* Cav. and *H. Rossmaessleri* Willk., *Dianthus Charidemi* Pau, *Galium valentinum* Lge., *Filago fuscescens* Pomel, *Centaurea Aemiliae* Font Quer (*C. aspera* x *Seridis*), *C. Mongoi* Pau, *Sideritis hirsuta* var. *maritima* Font Quer, and *Teucrium hifacense* Pau from the curious promontory of Hifac, between Alicante and Denia.

This was the spot where Boissier was forced to land on his first hazardous voyage down the Spanish coast in 1837, and where he discovered his new *Helianthemum caput-felis* on the low rocks connecting the cliff with the mainland. This is still the only known Spanish locality, although it has since been discovered in the Balearic Islands and Algeria.

Campanula orphanidea Boiss.—This species was described in the Flora Orientalis iii. 897 (1875) from specimens collected on Mt. Athos by Aucher-Eloy, Frivaldsky, Orphanides, and Pichler. Boissier correctly reduces the *C. calaminthifolia* of Grisebach in Spic. Flor. Rumel. ii. 286 (1844) non Lam. Dict. i. 585 (1785), as the plant collected on Athos by Friedrichsthal was named. Davidoff [Trav. de la Soc. Bulg. d. Sc. nat. viii. 91 (1915)] described a plant as a new species under the name *C. bulgarica*, a name already used for a microspecies of the *C. rotundifolia* group by Witasek [Mag. Bot. Lap. v. 244 (1906)]. In their Flora Bulgarica 1082 (1925) Stoyanoff and Stefanoff reduce Davidoff's plant to *C. orphanidea* Boiss. A plant collected by Dr. Stoyanoff on Mt. Ali-Botusch and referred to *C. orphanidea* did not quite agree with authentic material of this species at Kew and we therefore obtained the loan of additional material from Sofia. An examination of this has convinced us that the above nomenclature concerns only one species and that Stoyanoff and Stefanoff are correct in their reduction of Davidoff's *C. bulgarica*.

The specimens compared by us can be arranged in a remarkably graded series of which the extremes by themselves would appear worthy of specific rank. The specimens from Mt. Athos are fairly uniform. They have relatively stiff stout stems with from one to seven flowers which are nearly sessile, the calyx segments in the flowering condition are about 7 mm. in length, and the whole plant has a dense whitish indumentum. Davidoff's plant (from western Thrace, near Xanthi, on calcareous rocks, May 26, 1914) is practically indistinguishable from the Athos plants. Specimens collected by Stoyanoff and Stefanoff in the central Rodope, July 1924, have slightly more slender stems, are less hairy—the whole plant being more green, and the calyx segments more slender and more pointed. Lastly we have the specimens collected in rocky places on Mt. Ali-Botusch by Dr. Stoyanoff, July 10, 1920. These have extremely slender stems with most often only one flower to each, the calyx segments in the flowering condition are 1 cm. or more in length, and the white indumentum is present but is less conspicuous than in the Athos plants. The last named specimens we have labelled forma *gracilis*.

Boissier (l.c.) places the species in Sect. *Media* Subsect. *Quinqueloculares*. This is certainly incorrect; the species has always three carpels. The calyces are exappendiculate and the affinity seems to be with the series *Saxicolae* in the Subsect. *Triloculares*.

E. MILNE-REDHEAD & W. B. TURRILL.

Name changes in Gomphostigma Turcz.—The name *G. incomptum* (Linn. f.) N.E. Br. should supersede *G. incanum* Oliv. in Hook. Ic. Pl. t. 1472, as that plant proves to be identical with the type specimen of *Buddleja incompta* Linn. f., with which, by the courtesy of Dr. N. E. Svedelius of Upsala, I have had the opportunity of comparing it. *B. incompta* was omitted from the Flora Capensis. Thunberg states that he collected the plant in the Roggeveld, in Calvinia Division.

Similarly the name *G. virgatum* O. Kuntze, Rev. Gen. Pl. iii, 201, should supersede *G. scoparioides* Turcz., as the latter is identical with the type of *Buddleia virgata* Linn. f., a much older name.

N. E. BROWN.

Conservation of the name Gardenia.*—Mr. O. A. Farwell has kindly drawn attention to a bibliographical note published by him in the "American Midland Naturalist," vol. viii. p. 34 (Jan. 1922), in which he revived the name *Gardenia* Colden (1756) which has been included by Boehmer in the third edition of Ludwig's Definitiones Generum Plantarum (1760), but had otherwise been overlooked or ignored in botanical literature for over 160 years. *Gardenia* Colden is a prior name for *Triadenum* Raf. (1808), which is commonly reduced to *Hypericum*, but is regarded by some botanists in the United States as an independent genus. Under a strict application of the International Rules of Nomenclature the existence of the effectively published and technically valid name *Gardenia* Colden invalidates the name *Gardenia* Ellis (1761), which has been used for 169 years for an important genus of Rubiaceae, comprising over 100 species, including the "gardenia" of florists. In the light of the facts unearthed by Mr. Farwell, it is evidently desirable that *Gardenia* Ellis should be conserved, and it is therefore being added to a list of nomina generica conservanda which will be submitted for the consideration of the International Botanical Congress, 1930.

T. A. SPRAGUE.

Malay Poisons and Charm Cures.†—The first edition of Dr. Gimlette's book appeared in 1915, and the second in 1923: this, under review, is the third; it has the arrangement of the second, but is somewhat enlarged by new matter interpolated in all its parts. One-third of the book describes the charms by which a Malay seeks to alter the course of events in his favour, the rest the poisons by which those criminally inclined may endeavour to gain advantages —poisons used more often for gain or to annoy rather than for murder. The poisons of vegetable origin number 33; and a few accessory materials from other plants are discussed also.

The book is interesting, many-sided and excellent; it is particularly valuable, as the approval of the Government of the Federated

*Vide *Kew Bull.* 1929, p. 12.

†Malay Poisons and Charm Cures, by John D. Gimlette. J. and A. Churchill, 40, Gloucester Place, W. 1., 1929, pp. xiii + 301, plates 3, price 10*s.* 6*d.*

Malay States shows, from an administrative standpoint, because it throws light upon actions which from various motives are done in the shadow of secrecy.

On p. 195 for *Carapa malaccensis* read *Carapa moluccensis* ; and on p. 225 for *Unona dasmychala* read *Unona dasymaschala* or else *Desmos dasymaschala*. I.H.B.

Coniferae :* KEYS TO THE GENERA AND SPECIES, WITH ECONOMIC NOTES.—In this work the endeavour of the author, Mr. H. M. FitzPatrick, an ex-student of the College of Science, Dublin, has been to produce, in compact form, practicable keys, whereby, with the aid of a pocket lens, it may be possible to refer specimens of the *Coniferae* to their respective genera and species. The author has succeeded very well in his work and with the aid of these keys students of the *Coniferae* should experience little difficulty in placing most specimens in their correct species. With some species, however, there is always likely to be an element of doubt in the naming of very vigorous or very weak specimens, in the absence of flowers or mature cones. Cases in point are *Juniperus Sabina* and *J. virginiana* ; *Cupressus macrocarpa, C. Goveniana* and *C. sempervirens* ; and *Cedrus Libani* and *C. atlantica*. Following a short introduction Mr. FitzPatrick gives a classification of the 47 genera into which he has divided the Coniferae. In the *Cupressineae* he has taken the narrow view of *Thuya* and divided it into *Thuya, Biota* and *Thujopsis*, but he has allowed the species forming the *Chamaecyparis* group of *Cupressus* to remain as a group of *Cupressus*. He has also sunk *Prumnopitys* under *Podocarpus*, which is undoubtedly the correct thing to do. It is in forming keys for the *Cupressineae* that Mr. FitzPatrick has broken new ground. Here, after giving generic descriptions he proceeds to give distinguishing leaf characters for species in different genera. Thus 33 species in 7 genera, *Cupressus, Thuya, Biota, Microbiota, Thujopsis, Libocedrus* and *Fokienia*, are grouped with one another according to leaf characters. This is likely to be confusing and it would perhaps have been wise to have dealt with each genus separately. However, with the cone differences that are given there should be no real difficulty experienced in using the keys. At the end of the work are several pages of drawings by Mr. James A. Nolan depicting leafy shoots and leaf sections which add to the value of the work. If Mr. FitzPatrick would publish his keys in a small book suitable for the pocket their value would be greatly enhanced. W.D.

*Coniferae: Keys to the Genera and Species, with Economic Notes. By H. M. FitzPatrick, in the Scientific Proceedings of the Royal Dublin Society, Vol. 19, N.S. No. 19, April, 1929, pp. 189–260, pl. 9–15. Messrs. Hodges, Figgis & Co., 20, Nassau Street, Dublin, price 8s.

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